

July 26, 1956

# The **IRON AGE**

The National Metalworking Weekly



**Ultrasonics Probes For New Uses P.59**

**Steel Takes Its Case to the Public P.19**

**More Magnesium to Meet Industry's Needs P.24**

**Digest of the Week P-2**

# HOW **TRAMBEAM** KEEPS STEEL ON THE MOVE AT

A WHITING OPERATION REPORT

**CRUCIBLE STEEL CO. OF AMERICA**



Complete area coverage of Crucible Steel's Detroit warehouse is provided by three double-deck Trambeam cranes, serving as many bays.



TRAMBEAM  
Overhead Handling Systems

BULLETIN M-26  
**WHITING CORPORATION**  
HARVEY, ILLINOIS • NORWALK, CALIFORNIA  
TORONTO, ONTARIO

Many firms save money by keeping material and products on the move overhead. Whiting Trambeam Handling Systems are used because they provide the greatest efficiency per dollar invested. Trambeam provides flexible, low-cost handling; full-area coverage; quick, point-to-point transport; safe, easy stacking. In monorail or crane systems, it means an automatic increase in plant capacity.

The best way to look into Trambeam is to see how others are using it. Illustrated are five current case studies—all giving complete data on Trambeam operation in leading firms. Write today for these folders—you'll find them profitable reading.

**Whiting Corporation**  
**15601 Lathrop Ave., Harvey, Ill.**  
Manufacturers of Cranes • Trackmobile  
• Railroad • Foundry and Chemical  
Processing Equipment

1. Write for Bulletin M-26 giving data about Trambeam at Crucible Steel Company of America.

**Keep Things Moving  
FASTER  
and Save Money!**



2. Booklet shows Trambeam coverage of storage, shipping and receiving areas for Chase Brass and Copper Co. Bulletin M-31.



3. Here's one man push-button control for loads to 10 tons. See how Verson All-Steel Press Co. does it. Bulletin M-28.



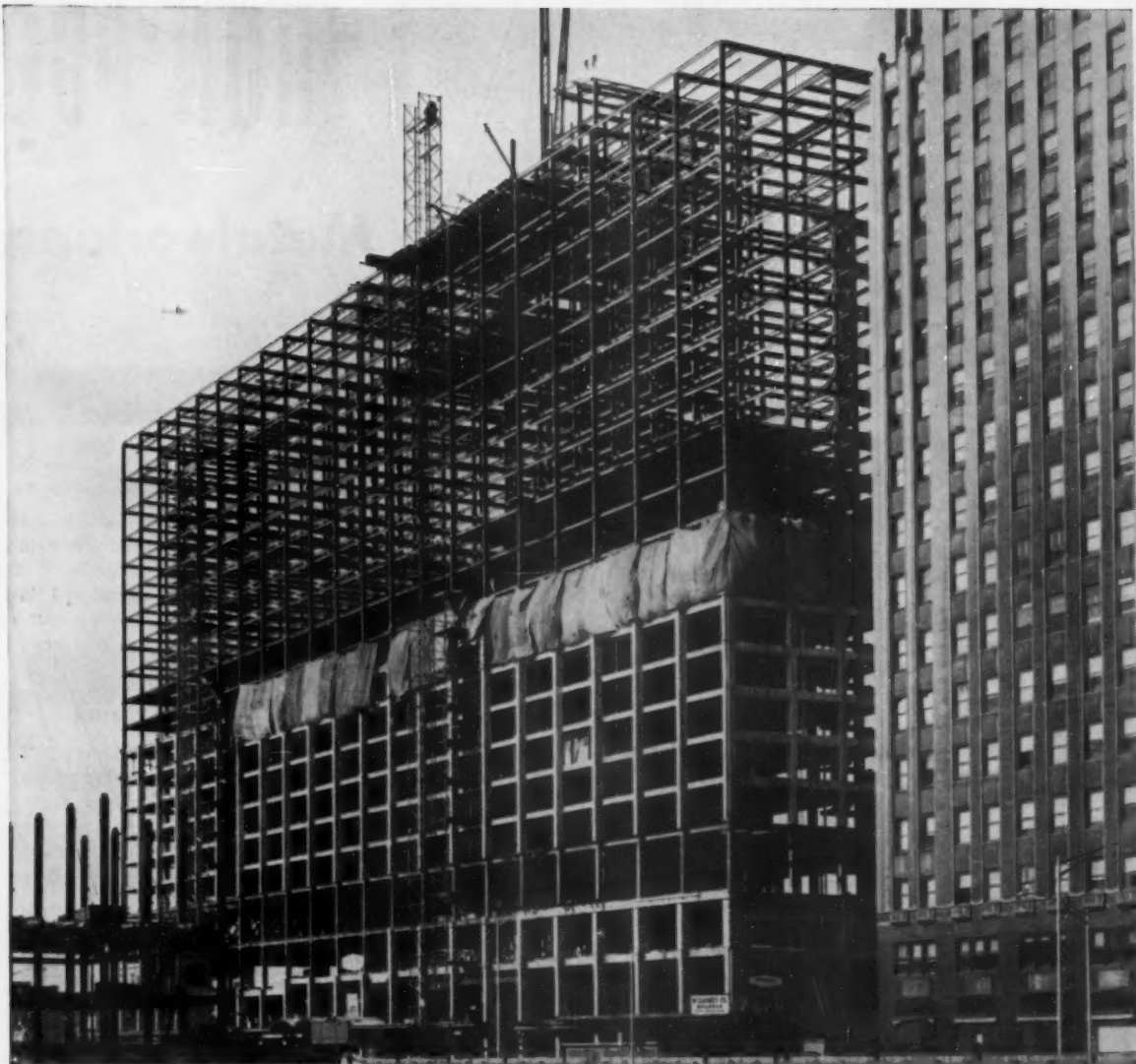
4. Discover how Trambeam speeds production at Westinghouse jet engine plant. That's the story told in Bulletin M-29.



5. Trambeam speeds charging and pouring in the foundry of Allis-Chalmers Manufacturing Co. Write for Bulletin M-27.







Owner: Sheraton Corporation of America. Architects: Perry, Shaw, Hepburn & Dean, Boston. Contractor: McCloskey & Co., Philadelphia. Structural Engineer: Maurice A. Reidy, Boston

## First Building in Philadelphia Erected With High-Strength Bolts

Here, shown under construction, is the Sheraton Hotel, the first multi-storied structure to be erected in Philadelphia by means of time-saving high-strength bolting. Bethlehem High-Strength Bolts connect the structural members of its 3900-ton framework.

The 21-story hotel is part of the Penn Center development in the heart of downtown Philadelphia. It has three floors of public rooms, 1000 guest rooms, and a top story of luxury suites with balconies, including a Presidential Suite.

Bethlehem High-Strength Bolts save time in steel erection because the joints can be made rapidly. In fact, a high-strength bolt, used with

hardened washers, can be installed in seconds. While a holding wrench grasps the bolt-head, the nut is driven to predetermined tension with a calibrated pneumatic impact wrench. It's that simple!

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If you would like to have full information about erecting steelwork with Bethlehem High-Strength Bolts, please telephone the nearest Bethlehem sales office. Or write direct to us at Bethlehem, Pa.

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# BETHLEHEM STEEL



**Digest of the Week in Metalworking**

Starred items are digested at right.

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**NEWS DEVELOPMENTS****STEEL FIGHTS PUBLIC****OPINION BATTLE**

P. 19

Industry learned its lesson the hard way, this year takes offensive in gaining public support. Good job was done in stating the issues and indications are steel is winning battle of words. Weapons are TV, newspaper ads, high level public relations.

**ODM HASTENS AMORTIZATION****STUDY**

P. 20

Federal action on reopening steel goals is stepped up in three urgent categories: structurals, heavy plate and oil country goods. Steel strike and Jones & Laughlin proposed Texas mills precipitate the action.

**COAL FIRED TURBINE****FOR LOCOMOTIVES**

P. 22

Tests of new coal-fired gas turbine by Bituminous Coal Research, Inc., gives new hope to coal industry. The pilot plant model at Dunkirk, N. Y., operates at nearly 200 pct saving in fuel costs over present diesel models. First engine due in 1958.

**STRIKE NEGOTIATORS HAVE****TIGER BY TAIL**

P. 119

Pressure from all sides is being brought to bear on industry and union negotiations in the steel strike. Quick resumption of peace talks after last week's breakdown reflects Washington efforts to force settlement.

**WHY NEW PRODUCER ENTERED****MAGNESIUM FIELD**

P. 24

Brooks & Perkins and Dominion Magnesium will build new plant in Alabama. New capacity is needed for defense and competition. Dow, now only private producer, welcomes new entry to the field. Defense plants are outmoded and uneconomical.



PORTABLE, EASY-TO-MANAGE equipment is one of ultrasonics' important selling points. Pictured here is a unit for checking the condition of heavy boiler plate. Unit detects weld porosity and other internal metal defects. (Wyatt Metal & Boiler Works, Inc. photo.)

## INDUSTRY STARS ON CLOSED CIRCUIT TV P. 30

Over 30,000 men in 10 different cities got the word on safety from the company's president at the same time. It's the latest in the growing number of closed circuit telecasts being put on by industry. It's expensive, but advocates tell why it's worth it.

## FEATURE ARTICLES

### ULTRASONICS: SOUND BREAKS METALWORKING BARRIERS P. 59

With many industrial tools and techniques to its credit, ultrasonics is now ready to probe an unlimited future. In metalworking alone, that future is likely to open new process horizons in heat treating, joining, electroplating, casting, and a host of fringe developments. Implementation hinges on design of full-scale industrial equipment.

### BETTER BRAZING TURNS ON ROTARY TABLES P. 64

Proper fixturing adapts brazing to a broad variety of high production requirements. Rotary tables are one such extremely useful device. While there are many ingenious setups here's how three plants solved their problems of getting higher production while maintaining brazing quality and slashing costs.

### INTERCHANGE INDUCTION COILS FOR JOB NEEDS P. 66

Since adaptability characterizes induction heating you can braze one day, temper the next—with the same basic equipment. Key to this flexibility is the induction workcoil, and its proper selection and design. Workcoils, when tailored correctly can boost heating efficiency.

### CONTINUOUS FURNACE AIDS SMALL PART HARDENING P. 70

Small parts can breed handling troubles that eat up profits. One heat treater found this true in case hardening a diverse line of small stampings. Continuous carbonitriding helped solve his troubles. Less costly, more uniform case hardening resulted from installation of a continuous batch-type furnace. Now operator loads part trays and furnace does the rest.

### STEEL HARDNESS DOESN'T BOTHER FRICTION SAW P. 72

Soft or hard, plain carbon or alloy steel, they're all the same to circular-bladed friction saws. Steel mills, fabricators, warehouses and foundries use them for fast, efficient cutting. At high speeds, heat of friction softens a small area of the workpiece. Blade literally wipes this metal out of cut.

## MARKETS AND PRICES

### HIGHWAY PROGRAM IS IN FINANCIAL TROUBLE P. 23

Congress underestimated cost of huge program recently approved. Estimated revenues will fall short of paying for vast system. Material, labor and real estate costs will all be higher than estimated. Mileage may be cut.

### AUTO PRODUCTION CHANGEOVERS ON SCHEDULE P. 26

Ford will be the first to convert its assembly plants to 1957 model production. Chrysler will be close behind and Pontiac will start the GM switch in October. The new models will see major changes.

### SMALLER WHEELS FOR 1957 CARS A PROBLEM P. 36

Wheelmaking firms have been turning their shops upside down in the rush to retool for the new 14-in. wheel adopted by most automakers for next year's models. Conventional 15-in. dies must be maintained to supply unchanged models.

### NEW JET ORDERS BOOST AIRCRAFT INDUSTRY P. 45

Aircraft subcontractors are oiling machinery in anticipation that pieces of a \$200 million order received by Convair for 40 jetliners will come their way. The new ships are first commercial U. S. short-range jets.

### STEEL PEACE TALKS HEADED FOR WASHINGTON P. 21

If steel strike is not settled by end of this week, peace talks will shift to Washington. New York negotiations will bring make-or-break concessions by both sides. But union's economic reports on prices won't help.

## NEXT WEEK:

### WATER FOR INDUSTRY: HOW BIG A PROBLEM?

U. S. plants use 80 billion gallons of water a day now, will need three times more by 1975. Here's a full-scale study of the situation. It considers conservation, waste control, use of new sources, technical aids and the government's role.

### LEADED STEELS BREAK PRODUCTION RECORDS

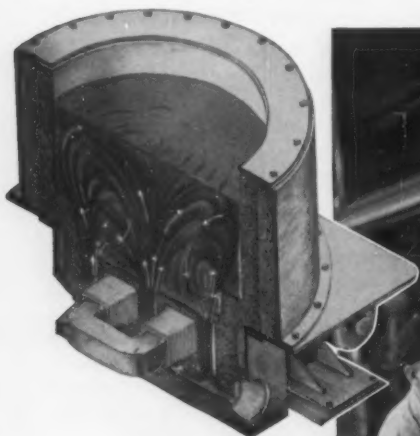
New and improved, they're proving claims for better machinability right on the production line. Here's one shop's experience in mass producing a highly critical coupling with a leaded 4640. Savings are spelled out for each operation.

# Hard-To-Melt Bronzes Successfully Handled

## In

### AJAX INDUCTION FURNACES

Brass and bronze foundries all over the country have found AJAX-TAMA-WYATT induction furnaces a reliable tool for melting silicon bronzes, aluminum bronzes, leaded bronzes, phosphor bronzes, and other high strength alloys. Operation is highly economical due to the good uniformity of the alloys, low ratio of rejects, drastic reduction of metal losses, and clean operating conditions. This recent development opens the field for the use of AJAX induction furnaces in all foundries where difficult-to-melt alloys are handled.



Cross section of AJAX-TAMA-WYATT twin coil induction furnace such as used at the Torrance Brass Foundry. Heat is produced within the molten metal in the secondary channels and conveyed throughout the melt by electromagnetic circulation, resulting in minimum metal losses and high uniformity of alloy. Temperature is automatically controlled.



(Photograph courtesy of Long Beach Press-Telegram, Long Beach, Cal.)

The furnace pictured here is melting aluminum bronze at the Torrance Brass Foundry, Torrance, Cal., operating at a temperature of 2400 F, for the production of high strength centrifugal castings.

This unit is rated 100 kw. Note also the clean, smokeless operation as shown in the unretouched photograph.

# AJAX

TAMA-WYATT

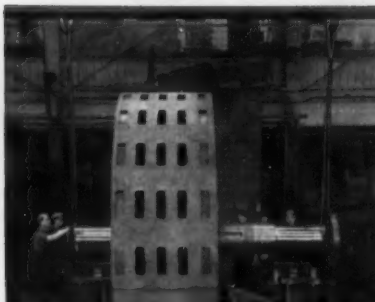
AJAX ENGINEERING CORP., TRENTON 7, N. J.



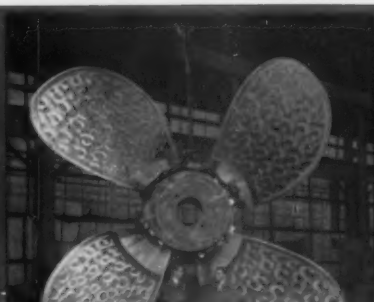
## INDUCTION MELTING FURNACE

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Two ATLAS Type 1, 8-part Round-Braided Slings handling generator unit.

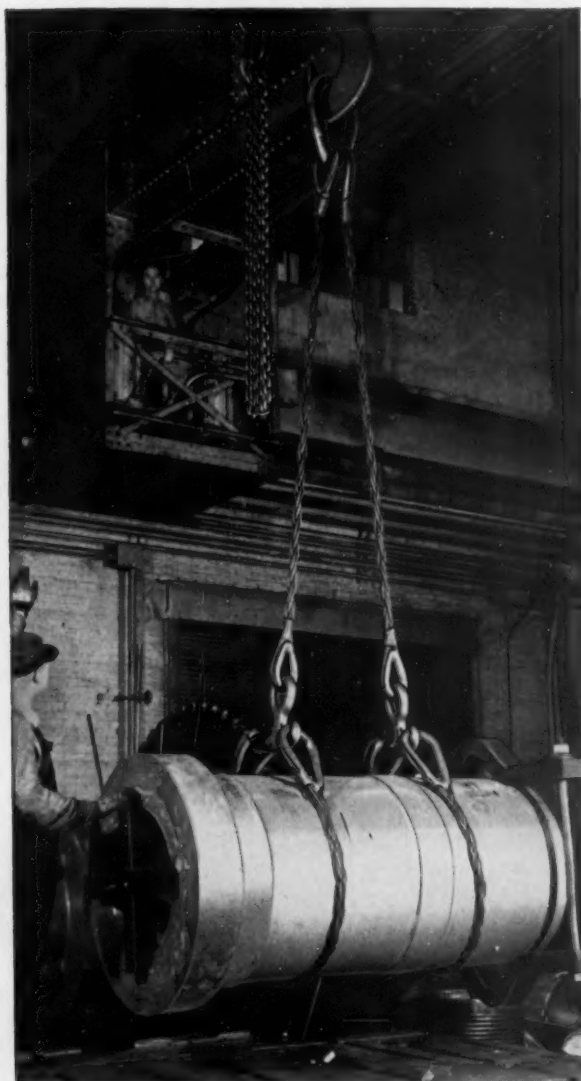


ATLAS Type 1, 8-part Round-Braided Sling used in Figure 8 hitch for handling ship propeller 22 ft. in diameter and weighing 71,500 lbs.



Two ATLAS Type 5 Whip Slings used with an assembly E Sling centering roll in lathe.

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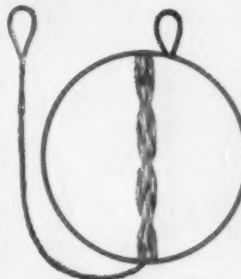
Because ATLAS slings are so lightweight and flexible, they are easy to use and save handling time.

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We will also make slings to your specifications.

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- 3 All ropes in the body react in the same manner when loaded and each rope carries an equal share of the load.
- 4 These features produce a lightweight, flexible, kink-resisting sling that hugs the load for safe and economical handling.



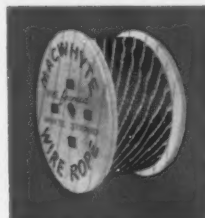
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July 26, 1956

## EDITORIAL

### The Dilemma of David McDonald

♦ JUST AS THE STEEL INDUSTRY had its pre-strike dilemma so did Dave McDonald, Steelworker chief, have his.

Mr. McDonald knows as well as anyone that times have changed. The union has the strike as its most potent "persuader." But as each year passes people expect both union and management to settle differences without warfare.

Dave McDonald tried to indicate that workers didn't stand to lose much in this strike. He argued that the industry would have laid people off anyway because demand for steel would have sagged. With a vacation and with time off because of less production he held out promise that a good contract would counteract any loss sustained by the workers.

Although that appeared logical, it furnished evidence that Mr. McDonald went into the strike in a dilemma. He did not want the strike and probably thought it could have been avoided. The catch was that steel companies stood firm.

The Steelworker chief could have accepted the five-year package offered him. But he may have felt he would be criticised for tying up the men over so long a period. But steel firms countered with their offer of a cost-of-living clause.

Here was another horn of the dilemma. The steelworkers never have put much faith in a cost-of-living clause. They want a big deal every year. They turned down a cost-of-living clause in 1937 and the late Phillip Murray never went for it. So Mr. McDonald ran true to past form but left himself wide open to the charge that he turned down a good offer. To a degree, the steel firms gave him everything he asked for, except that they made the term longer.

The question of statesmanship was another horn of McDonald's dilemma. He has on many occasions indicated that he represents the new look in labor. His speeches have emphasized this. By reverting to old-time sulphurous phrases and a long strike he has flown in the face of his previous public utterances.

Dave McDonald chose the old way . . . the hard way. Now he has to live with it and prove to the workers, to the public and to himself that the strike was worth it.

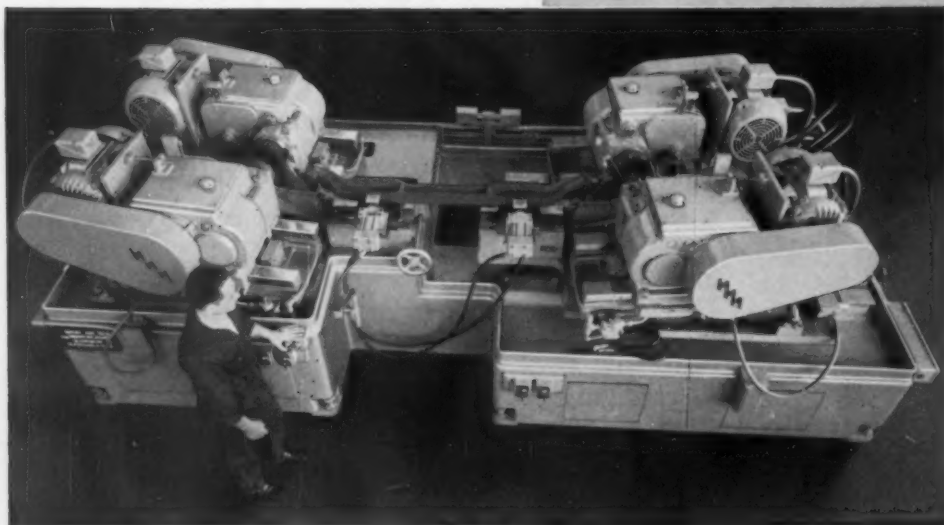
*Tom Campbell*

EDITOR-IN-CHIEF

# MIGHTY BIG JOB

## MINIMIZED by another

### MOTCH & MERRYWEATHER *Production Solution*

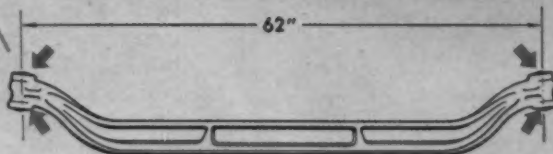


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dear editor:

letters from readers

### Forgotten Man

Sir:

We so enjoyed the article by Mr. Harold J. Ruttenberg in the July 5 edition of THE IRON AGE that we plan to distribute copies to our supervisory personnel.

Your publication is widely read by many of our key employees, and we commend you for the excellence of the timely articles found in every edition. *D. J. Reed, Asst. to Director of Industrial Relations, American Machine and Metals, Inc., East Moline, Ill.*

Sir:

We read with interest your article "Labor: Small Business is Forgotten Man" written by Mr. Harold J. Ruttenberg. We would like very much to have 150 reprints of this article to enclose with the paychecks of our factory payroll. We think it would be good reading for all our employees. *C. B. Sturm, Purchasing Agent, Kewanee Mfg. Co., Kewanee, Ill.*

### What's Freedom Worth?

Sir:

I wish to compliment you on your fine editorial, "Is Freedom Worth Much To Us?" Copies have been made of it, along with your signature, and have been placed on the bulletin boards of each of our four small plants. So many of us let the Fourth of July go by as a time for noisy displays, without thoughts of what freedom really means to us. *H. Gichner, Fred. S. Gichner Iron Works, Inc., Washington, D. C.*

### Leak Detector

Your June 14, 1956, issue has an interesting article entitled "What's New in Plane-makers Methods."

Reference is made to a portable leak detector which may be of

value to me. Can you enlighten me regarding a source for additional information? *A. Mendelson, Chief Tool Designer, Plymouth Div., Chrysler Corp., Detroit, Mich.*

*Consolidated Electrodynamics Corp., 300 North Sierra Madre Villa, Pasadena, Calif. —Ed.*

### How To Beat The Heat

Sir:

May we offer our congratulations on the remarkable presentation on "How to Beat the Heat." It is not only very stimulating and informative, but is also quite far reaching in its scope and surprisingly accurate. *B. R. Small, Aluminum Company of America, Pittsburgh, Pa.*



One Way to Beat It

Sir:

Please send me a copy of your article "How To Beat The Heat—Survey report to Management" which appeared in your June 21, 1956, issue.

This is a problem which most factories are confronted with and your discourse gives a series of answers which can be selected and suited to each particular need. *A. R. Wagstaff, J. L. Clark Mfg. Co., Rockford, Ill.*

A few copies are still available.—Ed.

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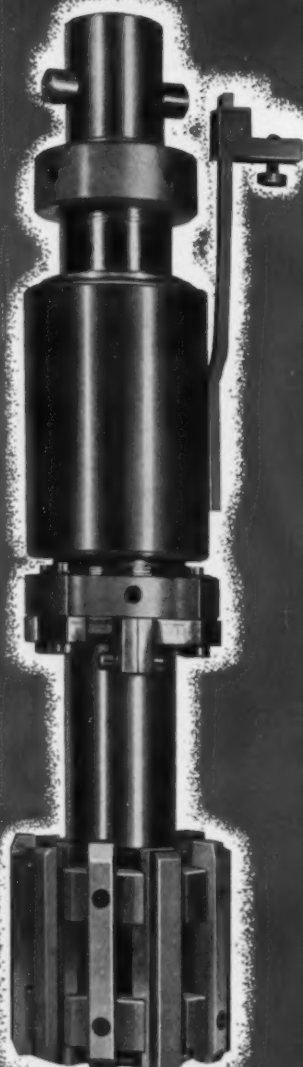
And if you need finishing operations—grinding, machining, heat treating, we have the facilities. Write or phone us about discs, rings, bosses, gear and sprocket blanks, washers (heavy duty), drive plates, or irregular shapes.

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SIZE CONTROL  
**HONE**



CYLINDER BORE  
SIZE CONTROL  
HONING TOOL

## DESIGN AND OPERATING SIMPLICITY

A new rigid shaft construction, without "universal joints" makes the Jes-Cal size control hone a solidly supported extension of the machine spindle. This construction eliminates the need for actuating bushings and bushing bracket, permits generation of bore accuracy and correction of error within limits of only a few ten-thousandths of an inch, closer parallelism of bore axes as in cylinder blocks, and eliminates "swipes" as the tool leaves the bore. Simpler tool design with relatively fewer, precision built parts minimizes chatter, permitting faster, cooler, more positive cutting action with lower cutting pressure.

The Jes-Cal size control gage is positioned around the honing tool spindle. It has carbide tipped contact points for long, hard service of many months without losing size, and is the most positive, dependable and economical method of size control available. This gage stops honing action immediately and automatically, through a simple limit switch, when the gage enters the bore.

## DEPENDABLE MACHINING ACTION

The Jes-Cal rigid shaft construction delivers a maximum of spindle power application, permits extremely fast and efficient stock removal, and makes possible corrections of large amounts of error such as out-of-roundness, snakiness, bell mouth and taper. Bore accuracy may be held easily within the range of 0.0001 to 0.0005-inch limits in most applications.

## LOWER OPERATING COSTS

The above features with their many refinements permit Jes-Cal size control honing tools to record much lower operating costs in production as compared with previous experience.

Write for Bulletin JC-101



METAL  
SHELL AND STONE  
ASSEMBLY



JES-CAL PLASTIC MOUNTED STONES  
WITH LEADING EDGE AND SIDE OPEN



SMALL DIAMETER  
SIZE CONTROL  
HONING TOOL



CON ROD  
SIZE CONTROL  
HONING TOOL



**JES-CAL COMPANY**

13500 EAST NINE MILE ROAD, EAST DETROIT, MICHIGAN

## fatigue cracks

### The Steel Strike

Long before most of the nation's blast furnaces were banked and the last heats tapped from openhearth and electrics on June 30, readers of your favorite family journal were advised that the odds were there'd be a strike. Financial editors of the wire services and newspapers carried reams of copy credited to your f.f.j.

Radio newscasters picked up many an IRON AGE quote too. Because we use a clipping service we have a pretty good idea of the newspaper and national newsmagazine coverage.

There's one reference to the chances of a '56 strike which we trust and sincerely believe all of our readers missed. So we give it to you here. It's from the June 16 issue of *Weekly People*, "Official Organ of the Socialist Labor Party":

*"In capitalist quarters they say the odds are on a steel strike. The Iron Age, the steel companies' magazine, says the odds are 55 to 45 that there will be one."*

P. S.—We are not the steel companies' magazine, or the aluminum companies' magazine or the machine tool builders' magazine, etc., etc.

### The Smithy Still Stands

Old arts and crafts die slowly and sometimes they come back with a slight name change. With few horses to shoe, the village smithy is as rare as a Pierce Arrow. From Gloucester, Mass., we learn of one Carl B. Friberg, who is Prop. of the Industrial Blacksmith Shop there in the fishing center.

Carl says he is the only blacksmith in Gloucester, a statement with which we are disinclined to quibble. He says further that he

by William M. Coffey

is the third generation of smiths in his family and that he has built up a nice business with the fishing fleets. Builds trawl doors for the fleets along the Atlantic Seaboard and has shipped them as far as Monterey, Calif. (L.A. Chamber of Commerce please note.)

Here, see cut, is a shot of Mr.



Boston Sunday Herald

**FORGING mackerel net anchor, Gloucester smithy carries on an old family tradition.**

Friberg working on a 45-lb anchor, part of an order for 50 of the things. They're used to moor mackerel nets, he says. The shop also does flame cutting and heat treating, but we'll ruin the story if we get into that modern stuff.

### Puzzlers

Did we neglect to give you the answers to the snail and pole puzzle? Well, we are sorry. The answer is 112".

Here's a new one from Mr. D. M. Ertner of the Western Electric Company, St. Paul, Minn.

A piece of lumber is 9" x 16". Make a single cut (not necessarily a straight line) so that there are two separate pieces of lumber. Relocate the two pieces in such a manner that a 12" square will be the result.

## "PHOSPHOR BRONZE."

a tough, resilient, corrosion resistant alloy . . . is a vital part of our daily living . . .



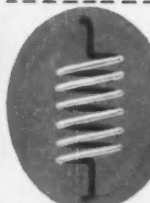
### ELECTRIC MOTORS

. . . run better and longer with bearings and wearing parts made of Elephant Brand Phosphor Bronze.



### SWITCHES

. . . owe much of their life and usefulness to fatigue resisting parts of Elephant Brand Phosphor Bronze.



### SPRINGS

. . . hold their temper and bounce longer and better if they are made of Elephant Brand Phosphor Bronze.



### MARINE EQUIPMENT

. . . resists water and weather with engine parts and hardware made of Elephant Brand Phosphor Bronze.



### ELECTRONIC EQUIPMENT

. . . functions accurately and efficiently with components of Elephant Brand Phosphor Bronze.

The best bears either of these two marks



## ELEPHANT BRAND®

**THE PHOSPHOR BRONZE CORPORATION**

Subsidiary of The Seymour Manufacturing Company  
2 Franklin Street, Seymour, Connecticut



## WHEN YOUR PRODUCTION LINE'S IN TROUBLE Get "ELL" & "ESS" On the Double!

So heads are shearing off, threads are stripping and the fit's none too good.

Somebody pulled a "boner" . . . probably tempted by a cut-rate price.

Pretty expensive "saving" isn't it?

There's a lot more behind a fastener than the price tag it carries:

EXPERIENCE, QUALITY, "KNOW-HOW", REPUTATION AND ENGINEERING SERVICE.

But all is not lost. Get "Ell" & "Ess" on the line and this experienced pair will pull your irons out of the fire!

Lamson & Sessions ("Ell" & "Ess", to you) have been called in on many a "foul up" and haven't failed yet to put their knowing fingers on the cause.

So, if double trouble sets in, let "Ell" & "Ess" give you a hand. It's another extra and free service to you from Lamson & Sessions.



*The* **LAMSON & SESSIONS Co.**

1971 West 85th Street • Cleveland 2, Ohio  
PLANTS AT CLEVELAND AND KENT, OHIO • BIRMINGHAM • CHICAGO



## dates to remember

### AUGUST

#### Society of Automotive Engineers, Inc.

—National west coast meeting, Aug. 6-8, Mark Hopkins Hotel, San Francisco. Society headquarters, 29 W. 39th St., New York.

#### National Screw Machine Products Assn.

—Annual national sales conference, Aug. 7-8, Wade Park Manor Hotel, Cleveland. Society headquarters, NSMPA Bldg., Cleveland.

#### Western Electronic Show and Convention

—Aug. 21-24, Pan Pacific Auditorium and Ambassador Hotel, Information, WESCON, 344 N. LaBrea Ave., Los Angeles.

### EXPOSITIONS

Assn. of Iron & Steel Engineers, Sept. 25-28, Cleveland.

Metal Show—Oct. 8-12, Cleveland.

### SEPTEMBER

Metal Powder Assn.—Fall meeting, Sept. 7-9, Homestead, Hot Springs, Va. Society headquarters, 420 Lexington Ave., N. Y.

American Institute of Chemical Engineers—Fall meeting, Sept. 9-12, William Penn Hotel, Pittsburgh. Society headquarters, 120 E. 41st, N. Y.

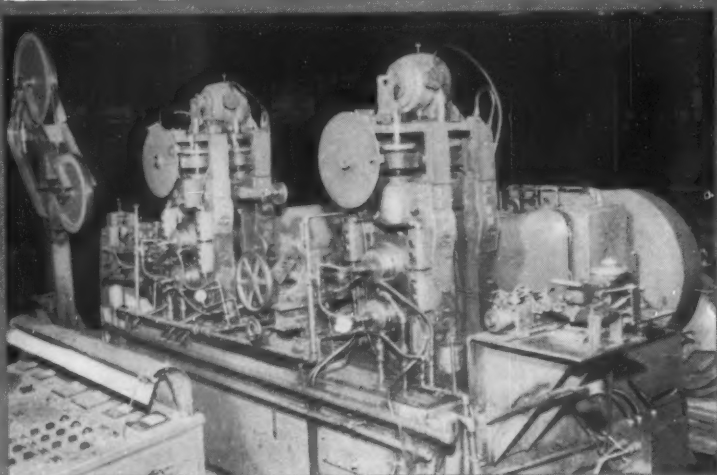
Society of Automotive Engineers—National tractor meeting and production forum, Sept. 10-13, Hotel Schroeder, Milwaukee. Society headquarters, 29 W. 39th St., N. Y.

American Die Casting Institute—Annual meeting, Sept. 11-13, Edgewater Beach Hotel, Chicago. Society headquarters, 366 Madison Ave., N. Y.

Porcelain Enamel Institute—Annual meeting, Sept. 12-14, Broadmoor Hotel, Colorado Springs, Colo. Society headquarters, 1145 19th St., N. W. Washington 6, D. C.

Instrument Society of America—Eleventh annual international instrument-automation conference and exhibit, Sept. 17-21, New York Coliseum, N. Y. Society headquarters, 1319 Allegheny Ave., Pittsburgh.

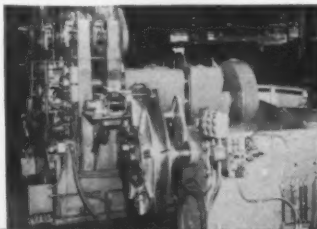
## ROLLING WIRE AT 1200 FPM



THIS Fenn Model 082 Tandem Rolling Mill is in operation at the Continental Steel Corporation, Kokomo, Indiana, and is an excellent example of modern, high speed, precision wire flattening. With this mill, Continental reports production speeds of 400 FPM to 1200 FPM. Wire sizes run ranged from 0.5 in. x .130 in. at 1600 lbs., per hour down to .197 in. x .024 in. at 600 lbs., per hour.

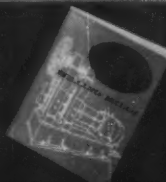
In addition to its precision operation and compactness the Model 082 mill features a one piece bed, automatic loop regulator, power screw-downs, friction-driven edger, electronic gaging, and hydraulically traversing take-up reel.

Whatever your requirements for rolling ferrous and nonferrous metals in sheets, strips, wire or rod, it will pay you to investigate the Fenn line of Precision Rolling Mills. Fenn engineering service is available at all times to help you solve any rolling problem.



# FENN

SEND FOR NEW  
FENN ROLLING  
MILL CATALOG



Precision Rolling Mills



Turks Heads



Wire Shaping Mills

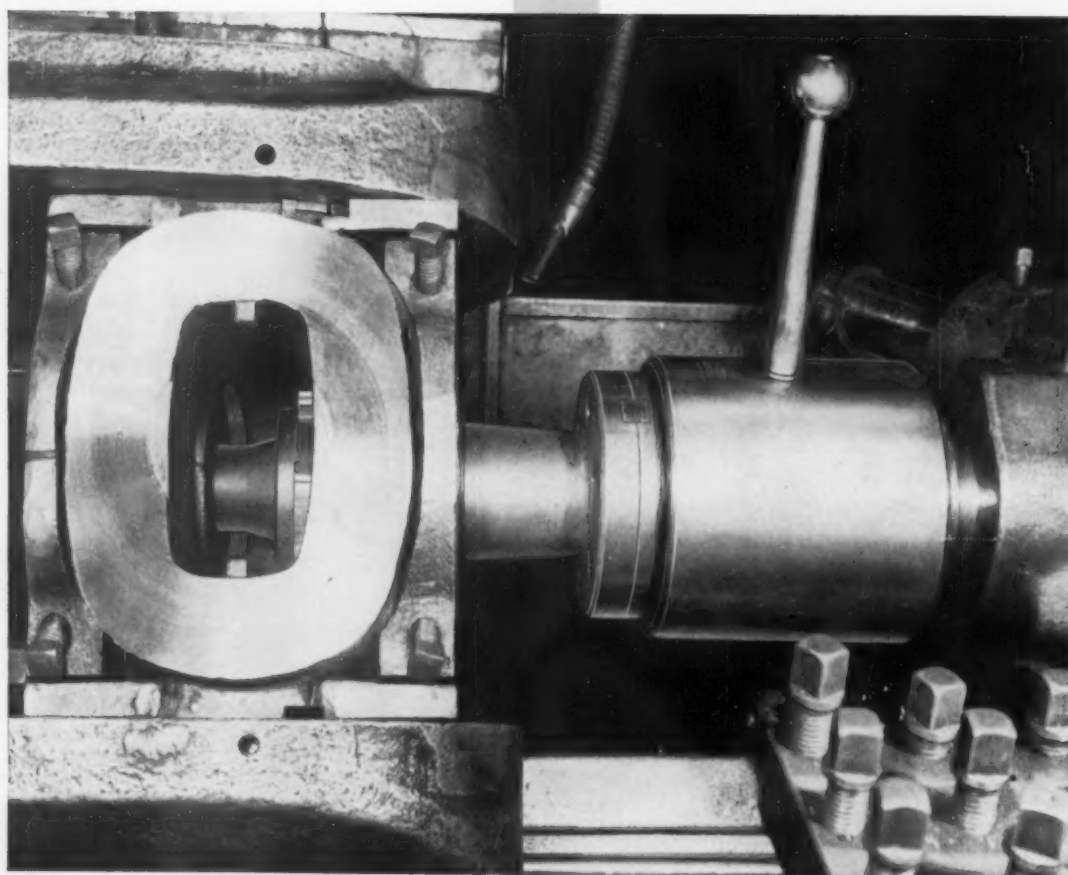
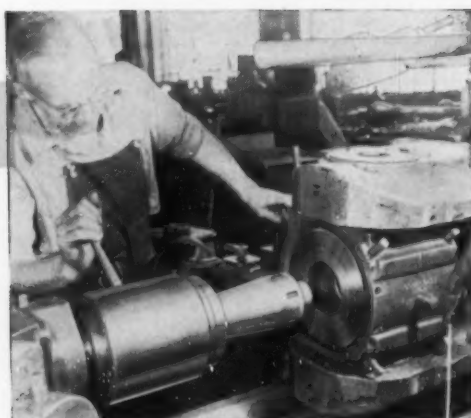


Swaging Machines



Wire and Tube Drawing Machines

FENN MANUFACTURING CO., 305 Fenn Road, Newington, Connecticut



# tapping threads from inside out

Seats are *tapped* in gate valves by using LANDIS Valve Taps, even though the diameter of the thread exceeds that of the valve port.

The use of a 6VB LANDIS Valve Tap at the Kerotest Mfg. Co., Pittsburgh Pa., illustrates the method and results of this operation. Specifications require 5" 12-pitch UN threads cut  $\frac{3}{8}$ " long to Class 3 fit in 4" steel body castings.

Even though the seat thread diameter exceeds that of the valve port, the "collapsing action" of the tap (which withdraws the chasers into the head) gives sufficient clearance to move the tap into the port. The chasers are then expanded (from  $\frac{3}{4}$ " on smaller taps to 2" on larger sizes) within the valve body, and threads are tapped outward as the lathe carriage is moved rearward by the leadscrew. (Note: Special chasers are available on certain of these operations that enable threading the opposing seats without removing the tap from the valve body.) After completing the thread, the tap is again collapsed and withdrawn.

Threads are cut at 12 R.P.M., and 100 threads are completed before regrinding the chasers. Each set of chasers produces an average of 700 pieces, excellent life with the short throat or chamfer required in this particular operation. Operation of the tap is by hand, and the valve body must be indexed 180° to thread the opposing seat.

LANDIS Valve Taps are available for diameters from 2" to 24", and each tap body can be equipped with tap heads of various sizes to thread many different seat diameters. Note that these taps feature a tapered head, of great value where valve seats are inclined at an angle to the port opening. This allows tipping the valve body into threading position after the tap has entered the port. More information on request—please send drawings.

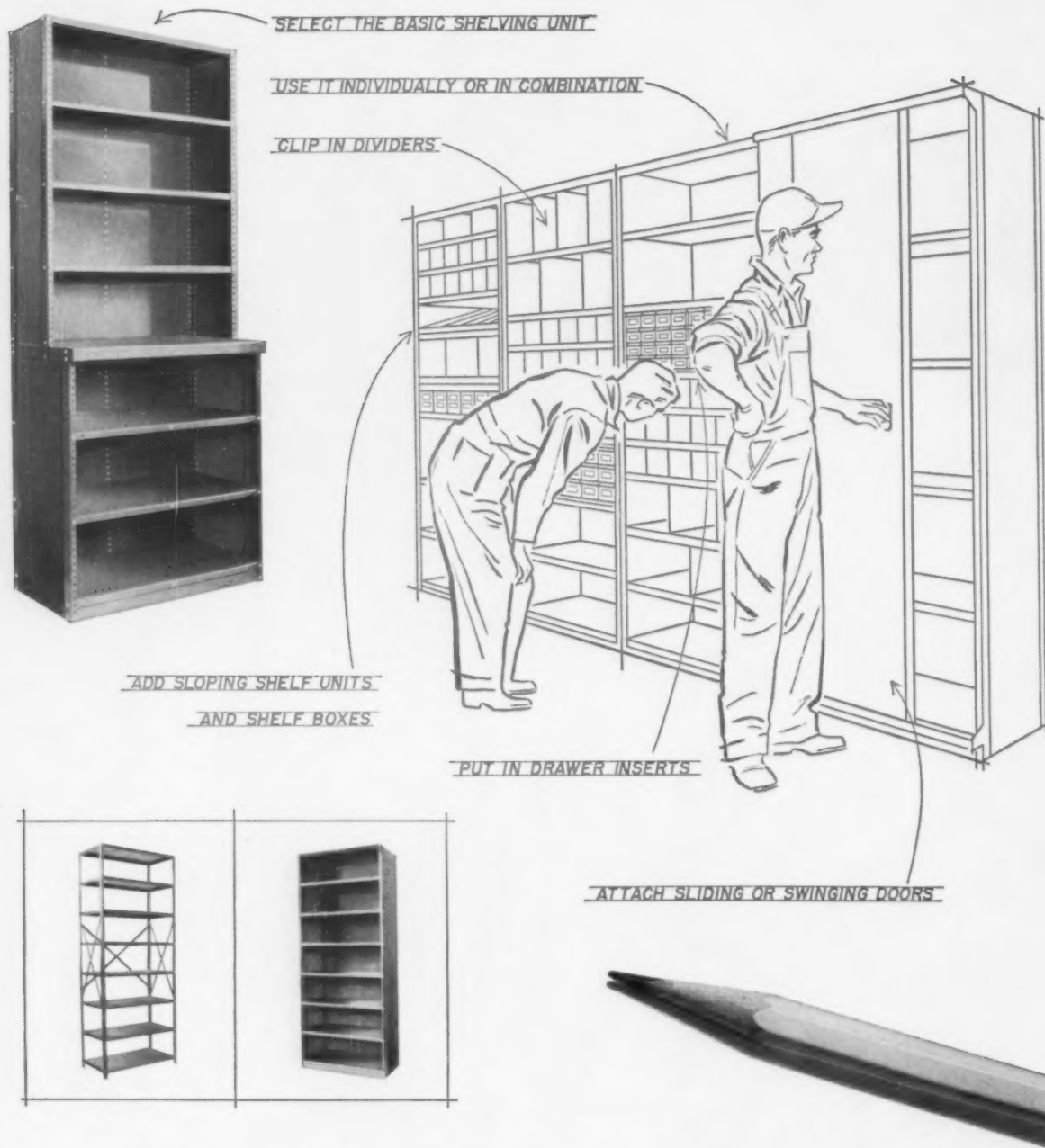
THE WORLD'S LARGEST MANUFACTURER OF THREADING EQUIPMENT CUTTING-TAPPING-GRINDING-ROLLING

**LANDIS Machine COMPANY**

437-C.

WAYNESBORO • PENNSYLVANIA • U. S. A.

# HOW TO USE HALLOWELL ADJUSTABLE SHELVING IN YOUR PLANT



Sturdy Steel Construction

Interchangeable Parts Easy to Assemble

Stocked by Leading Shop Equipment Dealers

Send for Catalog 2111 Hollowell Shop Equipment Division

Standard Pressed Steel Co., Jenkintown 17, Pa.

**HALLOWELL** SHOP EQUIPMENT DIVISION

**STANDARD PRESSED STEEL CO.**



JENKINTOWN PENNSYLVANIA

BENCHES (CABINET, WORK, UNIT) • STOOLS AND CHAIRS • SHOP DESKS • TOOL STANDS AND CABINETS • DRAWERS, DRAWER TIERS • STEEL CARTS • SHELVING



# HOW USS "T-1" STEEL IMPROVES THESE PRODUCTS...



**Lower-Cost Dirt.** This mammoth coal stripping machine scoops out 2000 cu. yds. of overburden an hour, cuts the cost of stripping coal that lies under 50 to 80 ft. of overburden. Its 22-ft. wheel carries eight buckets, each 4 ft. wide, with lips of 2½-inch USS "T-1" Steel. USS "T-1" Steel has the strength and toughness to scrape through shale, rock, mud, and ram into ton-and-a-half boulders day in and day out. In addition, it is weldable in the field, costs less than other steels that could be used—and outlasts them. This wheel excavator was designed by United Electric Coal Companies, Chicago, for their own use.



**Moloney Saves A Ton.** The size of everything had to be reduced on this new, smaller-than-ever portable transformer designed by Moloney Electric Company, St. Louis, Missouri. Over a ton of weight was saved in the tank alone by building it of ¼-inch USS "T-1" Steel instead of ¾-inch carbon steel. The very high strength of this heat-treated alloy steel made possible this 25% saving in weight. The excellent weldability of USS "T-1" Steel was important, too, because this portable transformer is permanently welded to the bed of a semi-trailer. This particular unit was designed for Oklahoma Gas & Electric Corporation. Shell was fabricated by Nooter Corporation, St. Louis.



**Heavier Loads, More Production.** Mack Welding Company, Duluth, Minnesota, has used USS "T-1" Steel to increase the durability and at the same time reduce the weight of its Orange Peel Type, Four Tine Pulpwood Grapples. With these new, lightweight grapples, crane operators can handle increased payloads with present cranes. As a result, production can be increased as much as 40 percent.



**Shucks,** hay fodder, corn cobs, and grains are extremely abrasive when sucked out of a hammermill at high speed. And the blades of the fan that does the sucking must be able to withstand the abrasion and must be weldable. Myers-Sherman Company, Streator, Illinois, manufacturers of industrial hammermills, now make these fan blades from USS "T-1" Steel and save \$7 on fabrication of each fan. USS "T-1" Steel provides all the needed durability, as well as good weldability.

## HOW IT CAN HELP YOU

USS "T-1" Steel, with its high minimum yield strength of 90,000 psi and its minimum tensile strength of 105,000 psi, can help you design or build lighter-weight equipment that will last longer. Its unusual toughness can help you design or build equipment capable of taking severe impact and abuse at sub-zero temperatures. Its excellent weldability can help you cut the cost of fabricating high strength parts, and to reduce repairs and maintenance expense.

Somewhere in your operation, versatile USS "T-1" Steel can help you. Write, wire, or phone United States Steel, Room 5397, Pittsburgh 30, Pa.

UNITED STATES STEEL CORPORATION, PITTSBURGH

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO

TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.

UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST

UNITED STATES STEEL EXPORT COMPANY, NEW YORK

**USS "T-1" CONSTRUCTIONAL ALLOY STEEL**

See The United States Steel Hour. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.



UNITED STATES STEEL

# "This forging lost 33 tons along



says **Joseph Lacey**,  
*Supt. of Machine Shops*  
*USS Homestead*  
*Forgings Division*



It was during the First World War, 38 years ago, that Joseph Lacey first toted his lunchbox as an apprentice machinist for United States Steel. He is now master of industrial machining, and has been entrusted with a large crew of machinists, inspectors and other experts who make USS Quality Forgings.

Visitors are always intrigued by the great difference between the ingot weight and the shipped weight of the forging. The picture, for example, shows a power station turbine rotor, one of our specialties. Forgings of this type have as much as 65% metal loss from ingot to shipped weight. Where and why did it go?

The nature of open die press forging on large ingots is such that considerable stock must be left on the various diameters of a contour forging. Top and bottom "crop" losses at the press, depending on various metallurgical factors such as ingot size and design, account for a considerable percentage of metal loss. However, other than "crop" losses, the open die press cannot remove large amounts of metal—this must be done in the machine shop.

When the forging arrives at the machine shop, special carbide tooling permits large amounts of steel to be "hogged off" through the use of high speeds and feeds and heavy cuts. This is known in the forging business as rough machining—fast removal of large amounts of metal. Rough machining is often accomplished in two stages—before and after heat treatment for physical properties. When specified, large masses of metal are removed in the preliminary rough machining operation known as "barking." After heat treatment, the machinist must "final rough machine" with sufficient stock allowance to permit the customer to finish the job to size in his machine shop.

So you can't skimp on steel if you want a superlative job—like a USS Quality Forging. A liberal, non-penny-pinching approach is needed, and that's what you get from United States Steel. Why not write for a free copy of our 32-page booklet that describes USS Quality Forgings? Address inquiries and booklet requests to United States Steel, Room 5397, 525 William Penn Place, Pittsburgh 30, Pa.

the way"



## USS QUALITY FORGINGS



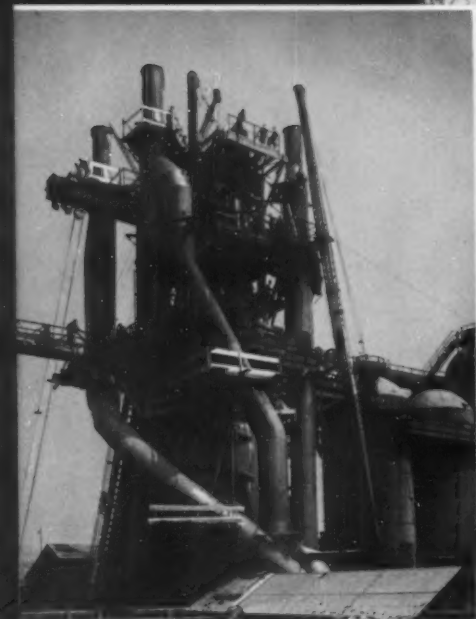
*heavy machinery parts . . . carbon, alloy, stainless*

*forged steel rolls and back-up roll sleeves*

*electrical and water wheel shafts*

*specialty forgings of all types*

**UNITED STATES STEEL**



**BLAST FURNACE** downcomer linings being gun-applied with Lumnite-concrete at Pittsburgh Works, Jones & Laughlin Steel Corp. Inset (left) shows blast furnace downcomer system lined with Lumnite Industrial Concrete.

## Protect downcomer systems with Industrial Concrete linings

Abrasion and heat put Lumnite-concrete linings to the test in these big blast furnace downcomers. But once "shot" into place, Lumnite® gives long-lasting, smooth, jointless linings that effectively withstand rugged service conditions. If repairs are needed, they can be made quickly and easily—because Lumnite-concrete reaches service strength within 24 hours.

Such linings are just one of the many profitable uses for Lumnite calcium-aluminate cement in blast furnaces. Use it also for **Heat-Resistant** foundation pads in blast furnaces and stoves; **Refractory** linings in hot blast mains, where the easy placement of Lumnite-concrete simplifies the once intricate job of forming Y-intersections; **Refractory Concrete insulation** for stove domes; and for many other jobs where high-temperature service up to 2600°F. and durability are needed.

Keep a supply of Lumnite cement or prepared Lumnite-

base castables on hand for emergency needs. Packaged castables containing Lumnite cement and selected aggregates assure the right concretes for a wide variety of high-temperature applications. Castables are made and distributed by leading manufacturers of refractories.

### UNIVERSAL ATLAS CEMENT COMPANY

UNITED STATES STEEL  CORPORATION SUBSIDIARY

100 PARK AVENUE, NEW YORK 17, N. Y.

\*"LUMNITE" is the registered trademark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company.

# Atlas® Lumnite Cement

L-12B

**FOR INDUSTRIAL CONCRETES**  
REFRACTORY • INSULATING • OVERNIGHT • CORROSION-RESISTANT

OFFICES: Albany • Birmingham • Boston • Chicago • Dayton • Kansas City • Milwaukee • Minneapolis • New York • Philadelphia • Pittsburgh • St. Louis • Waco  
United States Steel Hour—Televised on alternate Wednesdays—See your local newspaper for time and station.



## Thumbs Down On Atomic Engine

Outlook is dim in predictable future for atomic engine-driven vehicles, recent calculations reveal. With pinpoint source of nuclear power, engine weight still runs more than six tons. Smallest usable power output is 600 hp. To achieve even this weight reduction, temperature of nuclear reaction must exceed 5000° F.

## Trace Corrosion To Stress

Mechanical factors, as well as chemical reactions, can bring about some forms of corrosion. Recent test program concludes mechanical strain can accelerate oxidation, one common form of corrosion. This occurs at least in certain high nickel-chromium alloys specifically compounded for corrosion resistance. Under certain conditions, strain effects on oxidation process can be cumulative.

## Desulphurize Iron In Minutes

Deep secrecy shrouds a new U. S. process for reducing sulphur content in iron. Claimed highly efficient, it's intended to reduce sulphur content to less than 0.01 pct in a matter of minutes. Ironically, the French more than a month ago released details of a process designed to achieve the same purpose.

## Spacemen Aloft

Navy has no intention of blabbing details, but some authorities state a contract already has been issued on the earth satellite. A major mid-west metals fabricator, it's claimed, now has a Letter of Intent in his hands. Entirety of satellite, save instruments and booster rocket stages, will be magnesium.

## Locomotive Business Up

Quietly, without fanfare, locomotive builders bask in the glow of a considerable business increase over last year. Industry total, one source indicates, now runs about 70 pct ahead of a year ago at this time. Individual producers

show up to 100 pct increase. Even with steel strike, and spotty inventories, rising rate of locomotive purchases can push 1956 production about 35 pct over 1955's.

## Radiation Spots Submolecular Defects

Irradiation of metals produces still incompletely investigated changes in physical and mechanical properties. By comparing properties thus produced with those brought about by controlled plastic deformation, defects in the submolecular structure of metals may be identified. British source disclaims any definite conclusions right now, but technique offers a new (and possibly easier) way of getting at an old problem.

## Steel Strike: Short Contracts Out

Regardless of what happens on other issues, steel companies can point to 1956 as the year the one-year contract went out the window. Firm attitude on this point stems from steel's annual uncertainty over outcome of negotiations while other industries won long-term contracts from their unions. Not only steel makers suffered, but also steel consumers.

## Punched Cards Reach Small Metalworker

Argument against electric accounting machine cards and equipment, say small metalworkers, is difficulty in justifying such setups. Now comes a New England shop to argue the other way. Grossing less than \$5 million yearly, the firm uses punched cards to figure operation costs, material requirements, inventory and six other monthly reports. At annual cost of about \$25,000, company figures it saves \$5000 yearly over hand methods, just within the accounting and analysis department.

## Crane Sales Lift

Dollar value of electric crane industry shipments in first half of 1956 hit 185 pct of last year's average. Designs trend toward greater use of light metals.



Cleveland-equipped 30-ton traveling hoist in plant of the builder, S. Morgan Smith Co., York, Pa.

## 30-ton traveling hoist operated by 3 CLEVELANDS

TO ensure precision control of the hoisting drums of this traveling hoist, the builder installed a team of Cleveland Worm Gear Speed Reducers. Double reduction of motor speed is effected through an efficient hook-up. Gear shaft of the smaller center unit is extended on each side and connected with the input axles of two larger units which operate the hoisting drums at desired low speeds.

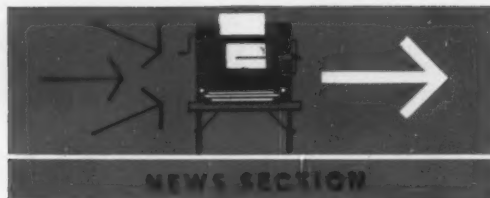
Clevelands fit perfectly into complex power transmission jobs. They're compact—right angle construction of a worm gear drive saves space. High shock load resistance and efficient performance are inherent. Parts are reduced to a minimum, reducing maintenance. Torque flow is smooth and uninterrupted. The case-hardened steel worm and nickel-bronze gear actually improve with use.

Wherever you have a power transmission need or problem, simple or complex, find out how a Cleveland speed reducer can handle it dependably and economically. Send for Catalog 400 today. The Cleveland Worm & Gear Company, 3282 East 80th Street, Cleveland 4, Ohio.

*Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited*



**CLEVELAND**  
Worm Gear  
*Speed Reducers*



## Who Would Gain From A Five-Year, No-Strike Agreement in Steel?

*You Would ... Everyone Would*

**For** a number of years now, the steel industry has been in a state of flux. The industry has been hit hard by a combination of factors, including a decline in demand for steel, a rise in the cost of raw materials, and a general economic slowdown. The industry has been forced to cut costs and improve efficiency in order to survive. One of the ways the industry has done this is by negotiating long-term contracts with its workers. These contracts have typically provided for a five-year term, during which the workers agree not to strike. In return, the industry agrees to provide the workers with a steady stream of jobs and a certain level of wages and benefits. This arrangement has been beneficial to both sides, as it has provided the industry with a stable workforce and the workers with a secure future. However, there are some who believe that this arrangement is not in the best interests of the workers. They argue that the workers are being locked into a contract that may not be the best one for them, and that they are being denied the right to bargain collectively. They also argue that the industry is using this arrangement as a way to avoid paying higher wages and benefits. While there are certainly some valid concerns, it is important to remember that the steel industry is a vital part of the economy, and that the workers who make it run are essential. A five-year, no-strike agreement is a way for both sides to ensure a stable future for themselves.

Despite the handicap of gearing their operations to mesh with the ideas of numerous bosses—the steel firms involved in the strike—public relations people in steel seem to have covered all the bases. Evidently the bumps and bruises suffered in earlier battles were not absorbed in vain.

Steel's public relations has smartened up. It's on the offensive. It's leading more, counter-punching less.

### An Early Start

Although PR people will deny it, steel's campaign to get the public on its side began last January when the first of a series of advertisements appeared in some 300 of the nation's newspapers.

The ads talked about steel and the jobs the industry provides; how steel affects people's lives; the enormous amounts of money needed for expansion; how steel

workers are among the highest-paid in industry. Last ad in the series appeared in April—a month before contract negotiations were scheduled to get under way.

While the advertising campaign told a story that needed to be told, regardless of how steel labor negotiations turned out, it played a role in conditioning the public mind for what came later.

When the crisis came, steel's public relations specialists were ready to roll. After being caught flat-footed by a surprise press conference held by David J. McDonald, president of the United Steel Workers, in which he rejected the steel companies' contract offer, the industry's PR corps earned its keep.

The steel companies matched steel labor, statement for statement. Most of their releases made good sense. They were easy to read, unencumbered by the

◆ **PICKET LINES** are only part of the battle in a labor dispute. The steel strike is no exception.

The battle for public support is another major front. It has been especially fierce in this year's dispute between steel companies and steel labor. It began months ago. It reached a peak just prior to the breakdown of negotiations. Public relations staffs on both sides of the fence are pulling no punches.

## How Steel Puts Its Best Foot Forward

■ Launched a nationwide pre-negotiation advertising campaign aimed at familiarizing the public with the steel industry's contributions to the economic health of the nation, its needs for funds to expand capacity, the well-being of steelworkers in terms of wages and fringe benefits. Series ran from January through April. Contract negotiations began in May.

■ The industry's public relations corps, normally a low pressure

group, moved fast and hit hard in offsetting union statements and explaining in simple terms the details of the 5-year contract offer.

■ Admiral Ben Moreell, chairman of Jones & Laughlin Steel Corp., went on a nationwide television hookup to outline the contract proposal and place responsibility for the strike in the union's lap.

■ Individual companies distrib-

uted letters and statements to employees explaining the companies' position. Employee magazines carried factual accounts of the negotiations leading to the strike, outlined benefits of the contract offer.

■ Media fact sheets detailing steel's side of the controversy were prepared and distributed to newspapers and magazines. Charges that industry "wanted" a strike were answered factually, in a convincing manner.

lawyer-language that clouded the issues in previous years. Top negotiators for steel made themselves available to reporters; they exposed themselves to close questioning at a special press luncheon.

Admiral Ben Moreell, chairman of Jones & Laughlin Steel Corp., told steel's story over a national television hookup.

The battle embraced the general public and the men in the mills—and their families. National news releases were supplemented by statements mailed to the homes of company employees.

Company magazines and newspapers, also mailed to the homes of employees, carried factual stories of the strike, and emphasized benefits of the new contract offer.

#### Battle Rolls On

The PR experts for steel got in more licks once the strike got under way. On July 13, the nation's newspapers carried an advertisement headed: "Would you like labor peace plus an annual raise for five years? That is what the steelworkers were offered by their companies — plus protection against increased living costs."

The ad listed major features of the steel companies' offer: Then it made these points: The offer would cost 65 cents an hour over the five years, or \$2.3 billion; steelworkers already are among the highest paid in the nation; that the companies hoped their offer would avoid a strike; that they wanted to be fair to their employees and at the same time retard inflation by spreading increased wage costs over a long period.

Just before the strike began, a steel company public relations man remarked facetiously, "We're banking our mimeograph machines." Nothing could be farther from the truth.

Steel has done a good—and long-overdue—job of taking its case to the public.

*Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.*

## EXPANSION

# FAST TAX: Steel Restudied

**Proposed J & L mill spurs restudy of oil country goods goal . . . Strike underscores shortages of heavy plates and structurals . . . Humphrey opposed—By N. R. Regeimbal.**

◆ **FEDERAL ACTION** on reopening steel goals has been speeded up because of the steel strike and application of Jones & Laughlin Steel Corp. for fast tax amortization of its proposed \$250 million Texas tube mill.

Originally scheduled to consider revamping steel goals early next year, the Office of Defense Mobilization is preparing immediate study of three critical steel products categories.

Continuing shortages of structural steel, especially in the face of the new federal highway program, and complaints by maritime and naval shipyards of lack of heavy plate, will bring a review of these goals in the next week or two. And the J&L application may touch off an immediate review of the shortage in oil country goods as well.

#### Military Yardstick

The J&L application for a certificate of necessity is being considered by ODM under "goal 224," which provides that tax aid can be granted for any productive facilities to fill military and Atomic Energy Commission procurement needs. This catch-all goal is being used now because goals for oil country goods are closed.

Whether the application can be granted depends on whether or not the government finds that the facilities can be easily converted to produce defense materials in event of an emergency—or that the need for oil and natural gas pipe is necessary to transport these products for defense.

#### Alternate Approach

The Defense and Interior departments will be asked their views on the defense need for the mill, as well as the Department of

Commerce, before ODM makes final decision on the application.

If a case cannot be made for the J&L mill under goal 224, it will be reconsidered under the reopening study.

A half dozen or more steel industry goals have been closed over the last two years, some as recently as last September, and except for the three now under study, the rest will be re-examined next year.

Included in this group is basic steelmaking capacity. The industry has been urging that it, too, be reopened, but the government claims that steel expansion in most categories is going along rapidly without federal tax aid.

#### Humphrey Says No

Under the fast-tax amortization program, ODM permits firms to write off in five years—instead of 20 or more years—about 60 pct of the total cost of new facilities which have been granted a certificate of necessity.

The steel plate goal, while still open technically, is filled, so that it would have to be increased in order to provide help for the shipyards and other users. The only other goal that remains open is for steel castings.

A formidable stumbling block in the path of fast-tax proponents is Secretary of the Treasury George Humphrey. He has repeatedly voiced his opposition to the government's granting tax aid except in the most pressing cases where private capital will not build vitally needed facilities without it.

In the past, steel production facilities have received write-offs of about 65 pct, slightly higher than the average.



## STEEL: Strike Heads For Washington

**If steel walkout is not settled this week, negotiators will be called to Washington . . . Politics and impact on economy pose serious problem for Administration . . . Both sides stubborn—By Tom Campbell.**

♦ IF THE NATION'S steel strike is not settled by the end of this week it may run to Labor Day—or longer. If labor and management negotiators show no sign of breaking the stalemate, the whole shebang will move to Washington.

Resumption of negotiations in New York on Tuesday reflected Washington pressure to effect a settlement. It's a good bet that make-or-break concessions will be on the agenda.

Meanwhile, close observers were said to feel that the union's economic report criticizing price policies of the steel companies is more likely to hinder than to help peace efforts. Producers, observers feel, might tend to fight harder for a medium-cost package and thus be in position to hold price increases to a minimum.

Over the weekend the union issued two "economic studies," each of some 50 pages, to charge that past wage increases have been followed by "exorbitant price increases." Reminiscent of the 1949 report of union economist Robert R. Nathan, the union charges that "for each \$1 increase in labor costs since 1945, exorbitant price increases have yielded \$3.19 in additional revenues."

This week the strike is well past its serious side. As forecast in *THE IRON AGE* weeks ago, the shutdown has lasted longer than most people thought it would. And it has created a sharp impact upon the economy despite efforts by some to paint the picture otherwise.

But both sides are adamant. The package the union wants is too much for the steel industry to swallow. The package offered by the steel side last week was spurned by the union.

### Behind the Scenes

The industry's idea of a "new approach" allowed it to deny there was a new offer. The suggestion made by the steel company negotiators were on the order of a 3-year contract with the benefits being three-fifths of what was originally offered with the 5-year proposal. Put in layman's language, that would mean a 3-year contract with total benefits of 39¢ an hour. Subtracting the 17 2/3¢ for the first year that would leave about 10 1/2¢ an hour for each of the second and third years.

Both the union and steel management people entered into an agreement weeks ago to keep any offer a secret from the press. Negotiators feel they can get an agreement much faster by keeping their discussions secret. Further, they do not want to try their fracas in public view. But that's what they may have to do if they are called to Washington by the Administration.

The flurry of denials last week took on the nature of a rash. More of the same may be expected as the strike lengthens. The denial that President Eisenhower had delivered an ultimatum to both sides was beside the point. He made it clear that the strike was making him unhappy. That was enough to qualify for "White House pressure."

### Splitting Hairs

The denial that the steel firms had made another offer was also a legalistic device. The coming down to three years with a comparable reduction in the benefits is—in the strict letter of the lawyers—hardly a new offer. And the fact that the union denied that there was an offer figures also.

Dave McDonald did not accept the first offer so he could hardly be said to have entertained the "new approach" suggestion.

Unless both sides react to White House and Cabinet pressures it will be most difficult to reach an agreement soon. The government has made a marked departure already from its aloof "hands off" policy of the past. If the addition of new pressures plus the threat that the dispute will be brought to Washington does not do the trick sterner stuff will be in order.

The labor and steel company negotiators are not happy about the entrance of the government into the picture. Both are reluctant to talk about it, but they feel that mediation efforts with the usual "background" pressures will bode neither side good. They are about 11¢ to 12¢ an hour apart on the total package cost. That is not the whole rub.

### Stumbling Blocks

Weekend premium is a serious stumbling block. The union—as reported three weeks ago in *THE IRON AGE*—does not want the weekend premium tied in any way with shift differential payments. And the union hopes to settle for time and one quarter for Sunday work. The other two stumbling blocks are: (a) how much the second and third year of the contract should be and (b) a surefire hassle over the retroactivity date.

If a meeting of the minds could be had, an agreement could spring up over night. Arthur J. Goldberg, the union's counsel, is known for his fast takeup of a general formula with the details to be worked out later. So far there hasn't been a remote chance

*Continued on p. 144*

## TURBINES: Coal Tries A Comeback

**Coal burning locomotive turbine completes tests with colors flying . . . First engine under construction expected to be operating by mid-1958 . . . Nearly 200 pct fuel saving predicted—By K. W. Bennett.**

♦ A LOCOMOTIVE TURBINE that gulps chunk coal, converts it into a powder, and converts it to power, all on the run, is past the talking stage.

Students of the coal burning locomotive turbine indicate that at least one model will be on the rails by mid-1958, and enthusiasts are taking bets that there will be several units in operation by the end of next year.

Judging from early railroad reaction, the enthusiasts may be right. At least two roads would buy such a unit immediately, and a total of at least five large roads are watching the developments with considerably more interest than can be judged from the mild comments being made publicly.

Initial development of the coal

burning turbine has been done with a stationary model built around an Allis-Chalmers turbine. In a statement in March of this year, Peter Broadley, research director for the Locomotive Development Committee of Bituminous Coal Research, Inc., indicated that, in a joint LDC-Alco Products test, the coal burning turbine could generate power at 20 cents per million Btu as compared with a comparable diesel cost of 83 cents per million Btu.

According to Mr. Broadley's report to the American Power Conference, the coal turbine could cut lubricating costs as well as fuel costs. He figured a total cost of \$11,500 for fuel and lubricant (none was used) as compared with \$28,745 for diesel operation.

While some diesel men will regard Mr. Broadley's conclusions with a somewhat jaundiced eye, the results have a number of railroads waiting with eagerness to test the first coal-burner.

### Pneumatic Feature

Preliminary reports indicate that it will quite possibly be 5000 hp, using new steels in the turbine blades (Haynes Stellite 31 and GMR-235), with no moving parts in the powdered coal feed which will operate pneumatically. The fuel mix is about 50 pct—50 mesh with particles up to  $\frac{3}{8}$  mesh.

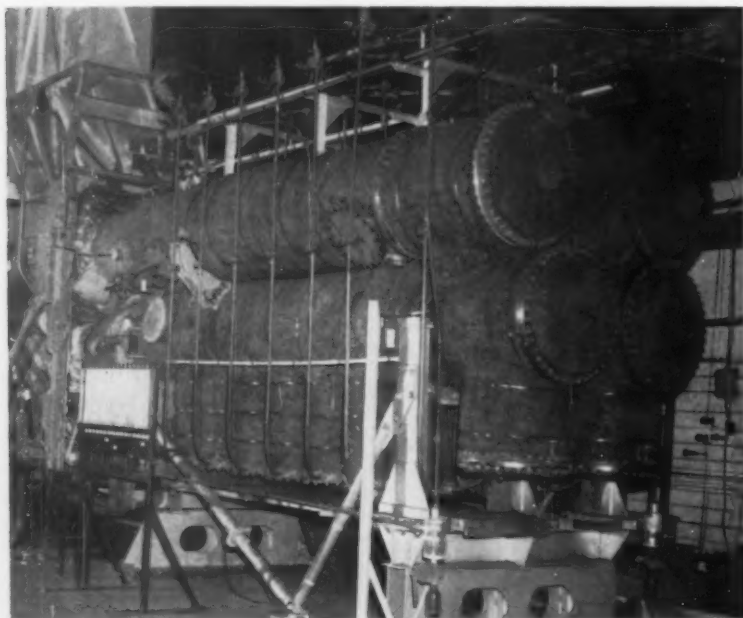
England has already developed a coal burning turbine that is regarded as possessing considerable merit, rated at 3000 ph. Cost of importing this unit, however, is expected to make the American built turbine considerably more economical.

### Difficult Infancy

Notable in the development of the coal burning locomotive turbine has been the work of Col. R. B. White, Chairman of the Board of the Baltimore & Ohio Railroad, who is chairman of the Locomotive Development Committee and nursed the coal burner through a difficult infancy to the point where the youngster seems about ready to father a brood of rail-borne units that may become popular railroading equipment.

But it's significant that strong interest is being shown by roads other than those represented on the committee, particularly those holding coal properties.

On paper, the coal burning turbine looks pretty good. But proof of a product is in consumer demand. And the customers are interested.



**VISUALIZE WHEELS** beneath this mass of plumbing, and a sleek hull surrounding it and you might have a mental picture of the locomotive of the future. It is a coal-fired turbine developed by Bituminous Coal Research Inc.

## HIGHWAYS: Look for Ruts in Road Program

**Highway program has financial trouble . . . Cost of huge network of highways was vastly underestimated . . . Alternates may be higher taxes or less mileage for the interstate system—By G. H. Baker.**

♦ THE NATION'S huge new road program is in financial trouble even before it gets rolling. The reason: Highway engineers, now blueprinting the first of the new road networks, are finding that the Congress underestimated costs.

Revenues from the new federal taxes on gasoline (up 1 cent per gallon), on tires (up 3 cents per lb), on trucks and buses (tax on manufacturers' prices up 2 percentage points), are going to fall far short of the amount needed. Under the law, the amount of actual construction may not exceed the money collected to finance the construction.

### May Cut Mileage

Congress figured 41,000 miles of new roads could be built for about \$25 billion. But the way the program is shaping up, the government will either have to cut the mileage to be built or go back to Congress and get the pay-as-you-go taxes boosted still higher.

Here's why the earlier estimates are faulty:

1. **Material Costs.** The cost of steel, cement, and roadbuilding machinery is already higher and is a cinch to be still higher next year.

2. **Labor Costs.** Under the highway law, contractors must pay federal minimum wages or better, thereby boosting road costs substantially in areas that customarily pay less (legally) than minimums.

3. **Higher Real Estate:** Where highway surveyors are seen sighting landscapes, the local citizens rub their hands and hitch the price up. Instances of this are being reported to Washington almost every day.

### Who'll Be Taxed

In condemnation proceedings, there's no questioning the right of the government to take land for a new highway. Only question: How much is it worth? Cow pastures

suddenly turn out to be worth a lot more than Congress thought.

If the user taxes are to be increased, it's unlikely that Congress will hit the private motorist again. Most politicians figure he's being taxed at the limit now. What they'll do is hit the truckers again, jacking up their taxes on gasoline and diesel fuel, on tires and tubes, and on the manufacturers' prices of buses and trucks.

### Boeing Expanding

In the jet age, more than ever before, research and testing facilities are fundamental to progress. That's mainly why Boeing Airplane Co. is borrowing \$75 million. A substantial part of the expansion will go into a research and development center.

With completion of its new expansion program in Seattle, the company will have spent as much in the new phase as it has invested in all its previous years in capital assets.

## Who Will Boss the Highway Program?

- **Bureaucrats are already wrangling over who'll boss the job of building the \$50 billion in new highways.**
- **Bureau of Public Roads of the Dept. of Commerce wants to run the program. But some ambitious office-seekers, backed by support within Congress, are lobbying for creation of a new agency to supervise the 13-year program.**
- **The Administration takes the position that the existing Bureau of Public Roads is well-qualified to take on the extra work—provided Congress will authorize a 25 pct increase in payroll.**
- **A number of Congressmen agree, but others want to create a new bureau, to be called something like the "Federal Highway Commission," to direct the mammoth program.**
- **Obvious advantage: A new agency always gives politicians a better opportunity to appoint more officeholders.**

### Granite City Furnace

The first new blast furnace to be built in the St. Louis area in 30 years has been put into operation at Granite City Steel Co.

Granite City is one of the steel producers which is not affected productionwise by the steel strike.

New unit replaces an older, obsolete furnace. The 635 ton shell was built on a platform 84 ft from the foundation at the same time as the old furnace was being torn down, and then moved into position.

As is traditional in the industry, the blast furnace was named after a woman—"Marian"—Mrs. John N. Marshall, wife of Granite City's chairman of the board.

## MAGNESIUM: Why New Capacity Is Needed

**Brooks & Perkins and Dominion Magnesium will locate new plant in Alabama . . . Production will be by ferrosilicon process . . . Dow welcomes competition . . . Capacity needed for defense—By G. G. Carr.**

♦ YOU CAN STOP worrying about future supplies of magnesium. The long-awaited second commercial producer is well on its way to becoming a reality. And from all indications it's not a bit too soon.

A joint venture of Brooks & Perkins, Inc., Detroit, and Dominion Magnesium, Ltd., Toronto, the new producer will be Alabama Metallurgical Corp., with a 480-acre plant site at Selma, Ala., 50 miles west of Montgomery. Initial rated capacity of the plant will be 10,000 tons of high purity magnesium annually, with provision for easy expansion in the future. Ground will be broken this fall, with start-up scheduled for '57.

Construction cost is given at about \$7 million, with annual employment about 300.

E. Howard Perkins, president and chairman of B&P, will be chairman of the new company. Lester G. White, formerly managing director of Dominion, will be president.

### High Purity Mg

The new plant will produce high purity magnesium from local dolomite by the ferrosilicon process. The word magnesium is not used in the title of the new company since other metals will also be produced. Calcium metal is definitely scheduled, and the company is studying titanium, zir-

conium, barium and the other "exotic metals." But it has no definite plans other than magnesium and calcium at present, according to Howard Perkins.

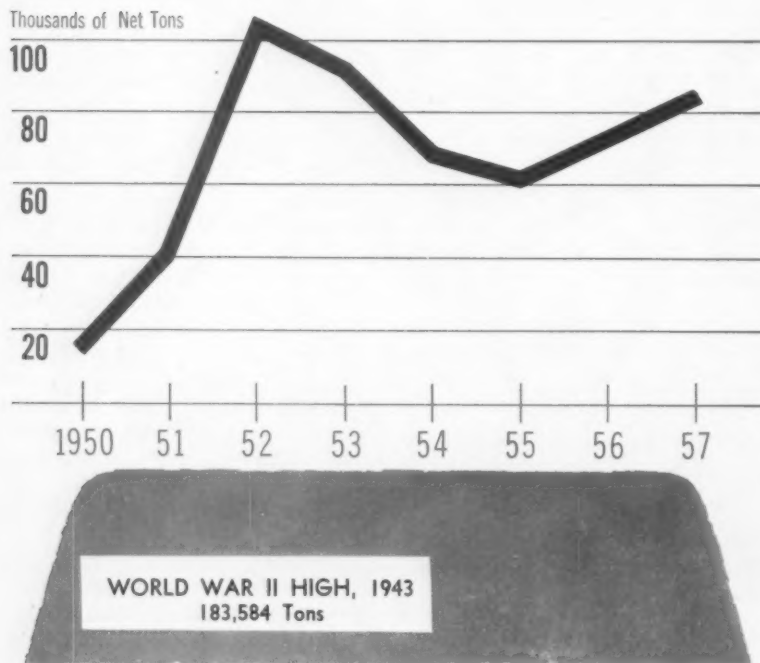
Initial capacity of 10,000 tons will add about 15 pct to existing U. S. commercial capacity, now at about 75,000 tons annually. And the new plant should prove a boost to the whole magnesium industry. Growth in magnesium use has been handicapped by an ironical chicken-egg situation. Dow Chemical Co., sole existing commercial producer, is currently running at capacity. Some output is being stockpiled by the company, but consumers agree that the stored quantities represent only a wise reserve supply of the metal. Consumption of mag this year is estimated at over 60,000 tons, and Howard Perkins predicts that demand will equal supply sometime in early '57. Add to this the inherent risks of depending on a single source of supply. This combination has frightened many potential users; two of the nation's largest companies have indicated they would substantially increase their use of magnesium if an alternate source were available. But until now, there has not been a backer for extra capacity.

### Good Competition

Dow states its new competition will be an important spur to overall magnesium use. Says president Dr. L. I. Doan:

"The Dow Chemical Co. welcomes the announcement by the Alabama Metallurgical Corp. of its plans to engage in the production of primary magnesium. Since competition is a healthy thing, both of our companies should benefit from this development.

### Boost in Mag Production





"Brooks & Perkins, Inc., and Dominion Magnesium Ltd. in the past have been highly successful in the magnesium industry. The application of their business experience to primary magnesium production in the U. S. should benefit both the magnesium industry and the public."

Single largest customer for the new plant is expected to be Atomic Energy Commission, which needs increasing quantities of high purity Mg for the refining of uranium and zirconium, among other metals.

#### New Markets

But the new company sees good future commercial markets for its product. Among others is cathodic protection.

Cost of the high purity metal will be not over 10 pct higher than current prices for commercial grade material (now 33.75¢ per lb in pig form). The company points out that Dominion magnesium has been successfully competing with Dow and foreign producers in world markets for some time with its ferrosilicon process metal.

#### Financing Details

The new company is privately financed jointly by B&P and Dominion, with B&P retaining controlling interest. No public stock offering will be made. Queried by THE IRON AGE as to the possibility of a fast tax writeoff, Mr. Perkins said he and his associates are "very much interested" but as yet have made no formal request for such aid.

In Washington, however, Office of Defense Mobilization has ordered a report within 60 days on results of a 4-year-old study of the defense needs of magnesium. ODM has been queried about the possibility of fast writeoff for the new plant, and needs the results of the study to give its answer on whether an expansion goal will be opened for magnesium.

The study is also supposed to cover the capacities of the government-owned magnesium plants, most of which are old, high-cost producers and located in Civil Defense target areas.

## RESEARCH

# What Inland Research Showed

**Continuous casting too big a gamble for large mill to try . . . But valuable lessons were learned from research and study . . . Some results were encouraging.**

◆ INLAND STEEL CO.'s look at continuous casting of carbon steels was encouraging. But the gamble of gearing a big mill's production around the process apparently was too big to take, particularly since Inland is involved in a big expansion program that must move ahead on schedule.

Inland had held up final commitment on a blooming-slabb mill long enough to study the possibility of using continuous casting and thus by-passing the blooming mill in its production setup. But recently it announced it was going through with plans for the conventional mill.

#### Thorough Trial

In cooperation with Atlas Steel Co., Welland, Ont., Koppers Co., and Continuous Metalcast Co., Inland cast a series of rimmed, semi-killed, and killed carbon steels, processed them through its plant at Indiana Harbor, Ind., and shipped the material to customers for regular production jobs.

But for production of the magnitude contemplated, equipment much larger in size than any heretofore used would have had to be built. The necessary development work would have involved a staggering risk for Inland.

Hjalmar W. Johnson, Inland vice president in charge of steel manufacturing, put it this way:

"The results of the tests were highly encouraging. It must be remembered, however, that Inland was contemplating a much larger operation than that in existence at Welland, Ont. However, there was not sufficient time available to master all of the problems of the new method and to insure perfection of a unit that could be integrated with existing facilities

within the limits of our expansion timetable."

#### Something Gained

In the Inland tests at Welland, slabs of 6-in. x 24-in., were cast from 30-ton heats. But Inland's minimum requirements would have involved a machine for casting 175-ton heats in two 8-in. x 45-in. slabs, simultaneously.

Dr. W. C. Rueckel, vice president and general manager of Koppers Engineering and Construction Div., and E. J. Hanley, president of Allegheny Ludlum, who have, through continuous metalcast, fostered the process in the U. S., said the Inland tests served to advance its development.

"Outstanding results obtained in the Inland tests have been obscured in the minds of some by the fact that Inland's final decision was against building a large continuous casting machine at this time," they said. "Actually, the Inland test results served to provide information of the greatest importance to the future of continuous casting."

#### Future Bright

Mr. Johnson added that technical knowledge and data accumulated during the tests is being assembled and "will be made available to the steel industry through the technical journals."

Continuous casting of steel has caught on in Europe and Asia, where the investment in conventional blooming and slabbing mill equipment is not so heavy. Dr. Rueckel and Mr. Hanley pointed to ten installations or projected installations of the same type of continuous casting machine in foreign countries.

## TOOLING: Cars Set for '57 Changeover

**Ford will be first to introduce new models but all automakers will be in 1957 production by Oct. 1 . . . Parts vendors busy since late in June . . . Major changes will require four-week shutdowns.**



◆ **FORD MOTOR CO.** is pacing the changeover to 1957 auto production.

Retooling was begun this week and Ford probably will be turning out the new models late in August for introduction in September.

Chrysler plans to start its changeover in August. The various divisions of General Motors will be down at different times depending on when they plan public announcement of the new cars.

Although it is not known exactly when the new GM cars will be introduced, Harlow H. Curtice, president of GM, said earlier this year that introductions would be practically at the same time as they were last year. He added there may

be a difference of 10 days one way or the other.

### Studebaker-Packard Question

If this is the case, Pontiac will announce in October and all other divisions will bring out their new cars in November. Chrysler will introduce in the latter part of September.

Among the independents, American Motors plans to announce its new models in mid-October. Present plans call for Studebaker-Packard to show its new cars about a month later. However, the plans are subject to change pending merger talks currently being conducted.

## Downtime for Some Means Jobs for Others

◆ **CHRYSLER CORP.** shifted into second gear this week in readiness for the 1957 model changeover.

The company recalled 935 workers in Indiana for production of parts for new models. But other workers at Chrysler assembly plants will begin a two to four-week layoff next month while the new parts are stocked in and tooling replaced.

Six hundred of the recalled workers will report to the company's New Castle, Ind., plant by Aug. 1. Another 335 are returning to the automatic transmission plant in Kokomo. It will swell employment

at New Castle plant to 2,100, while Kokomo will have a total of 1,750.

Chrysler expects to introduce its 1957 models to the public in September.

No immediate plans for recalling parts workers in the Detroit area were revealed by the company.

The remaining two major auto producers, General Motors and Ford, have not indicated they are ready to call back workers for parts production. Nevertheless, Ford is shutting down some assembly and stamping plants this week in preparation for changing over.

Thus, all producers will be in 1957 production by Oct. 1, because it is necessary to have a backlog of new cars in dealers' hands before public announcement.

### Parts Made Earlier

Actually, changeovers to new cars start much sooner than the public realizes. By the time a plant closes down to get set for actual assembly, the changeover is practically completed.

Anywhere from three to four months before new model assembly begins, an auto company's manufacturing section is busy turning out parts for the car. An early start is necessary because the various parts must be tested to make sure they meet specifications.

At the same time, vendors supplying parts and accessories for producers begin their production anywhere from four to six weeks in advance of car assembly. The same thing holds true here.

As a general rule, it could be said that the changeover proper starts 18 months before production of a new model. It is about that time releases are obtained for dies and fixtures.

### Major Changes Coming

So the actual time a plant is closed is to allow the producer to put his house in order for actual assembly. In a facelift year, downtime usually runs about two weeks. This year the industry will be down on an average of four weeks because of the major changes being made.

Not every worker is laid off during a changeover. Producers do their best to stagger layoffs so that the burden won't be too much for some workers.

## POWER CABLE: Two Sides To This Story

**Copper industry concedes 90-95 pct of overhead, high voltage business to aluminum . . . Maintains top spot in sales for underground installation . . . Outlook good for both—By F. J. Starin.**

♦ DURING the first six months of 1956, Consolidated Edison Co. in Metropolitan New York purchased 15.7 million lb of copper and only 1.7 million lb of aluminum in electrical conducting lines.

At the same time, American Gas and Electric Co. uses 10 lb of aluminum for each 1.5 lb of copper to transmit and distribute electric power.

Why the difference in policy?

It stems from the conductive properties of the two metals. Although aluminum is only 62 pct as effective as copper by volume, it enjoys a 204 pct weight advantage over copper.

Copper is still king in metropolitan areas where much of the transmission is underground through small ductwork. But in the rural areas where transmission is overhead, aluminum's light weight and lower cost have resulted in its replacing copper.

### Underground

Consolidated Edison has 53,000 miles of copper duct weighing about 222,424,000 lb under the streets of New York. It has only 30,000 miles overhead. Most of this is still copper, but the company is shifting to aluminum.

Copper is still used more than aluminum under ground, but new ductwork installed is 4-in. concrete, big enough to take either aluminum or copper.

Price is also in aluminum's favor. Con Edison reports that from 1951 through 1955, 1,899,000 lb of aluminum replaced 3,484,000 lb of copper at a savings of \$1.13 million, or 36 pct of the cost of the copper.

Early this year, Pacific Gas & Electric Co. replaced 145 miles of copper transmission line with aluminum. It required 4 million lb

of aluminum purchased from the Aluminum Co. of America to replace 7 million lb of copper. Alcoa estimates that Pacific made a profit of \$150,000, after deducting cost of cable and installation from price received for the copper scrap.

### Outlook Bright

A representative of one of the copper companies declares that the copper industry has "just about conceded about 90-95 pct of overhead high voltage lines business to aluminum."

Outlook for the transmission market is good for both metals. A large part of the \$75 billion to be spent by the electric power in the next 20 years will be on transmission facilities. (See IRON AGE, July 19, p. 67.)

Aluminum industry feels that it will continue to increase its share in this market. Consolidated Edison bought 452,000 lb in entire year of 1955, and has already purchased more than 4 times that, 1,725,000 lb thus far this year. Industry statistics indicate that 19 million lbs of aluminum conductor wire were shipped in April 1956 as compared to 13 million lb in May 1955.

Copper expects to maintain strong grip on metropolitan areas because underground ducts are too small for the larger diameter necessary in aluminum. While Consolidated Edison's aluminum purchases were up, they also bought as much copper during the first half of the year as during all of 1955.

Alcoa photo



ALUMINUM and steel spun together is ACSR, aluminum cable steel reinforced, the aluminum industry's big gun in landing most of the high voltage, overhead power transmission business. Copper is still king underground.

## EXPANSION IN INDUSTRY

### Westinghouse:

#### Latest expansion is at Large, Cleveland

Large, Pa., and Cleveland, O., are the scenes of the latest expansion projects of the Westinghouse Electric Corp.

At Large the company is expanding the facilities it is operating for the Atomic Energy Commission. Eight existing buildings are being transformed into necessary warehouses, engineering offices, shops and laboratories. Work is expected to be completed by January 1957.

Number of new atomic projects are on tap for extensive work as soon as the new facilities are ready.

At Cleveland Westinghouse will build a new manufacturing and repair plant. New facility will include about 58,000 sq ft of plant

area featuring heavier cranes to handle larger repair work more efficiently. Building will be one story, steel, concrete and brick.

Construction is scheduled to begin immediately and be completed by June 1957.

#### Up Four Times

A major expansion and renovation project at York-Gillespie Manufacturing Co., Pittsburgh, has resulted in a 400 pct increase in productive capacity.

The manufacturer of auxiliary steel plant equipment took over an adjacent building which provided an additional 40,000 sq ft of shop area. In addition, all obsolete equipment was replaced by direct drive, rapid transverse, high speed machines, including an 84 in. Morton draw-cut shaper; a 10 ft and a 6 ft planer; a 12½ ft vertical mill; and a 4½ in. spindle table mill.

Company develops and makes automatic and semi-automatic equipment for rolling mills; wire payoff reels, coilers and coil stripping equipment; cross cut and drop saws; and saw and shear gages.

#### New Blast Expansion

Alan Wood Steel Co., Swedeland, Pa., will spend \$1.5 million to boost the capacity of No. 2 blast furnace from 550 to 800 tons per day.

This will give the company annual pig iron capacity of close to 600,000 tons.

Company indicated that additional iron was necessary to continue to supply the needs of its foundry customers without penalizing its open hearths.

Enlargement is scheduled for completion by Spring, 1957.

#### Expansion Briefs

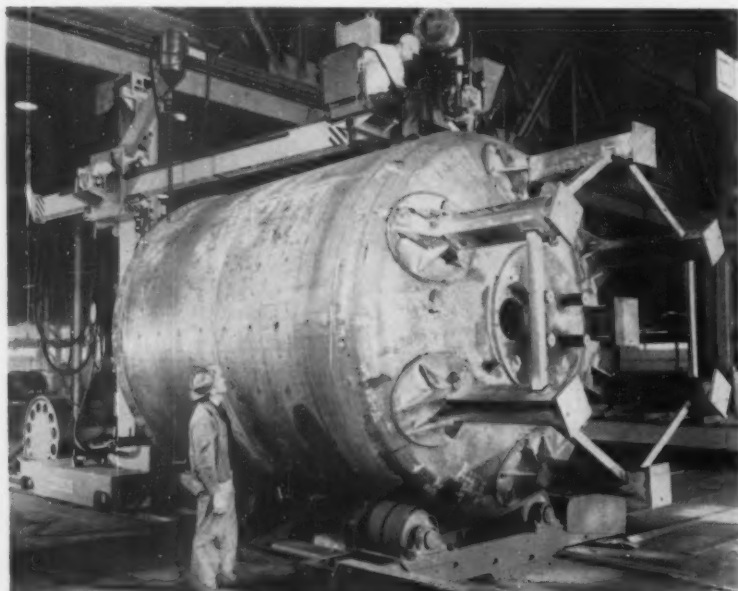
**Ransburg Electro-Coating Corp.**, Indianapolis, Ind.; new 80,000 sq ft plant; cost about \$800,000.

**R. Hoe & Co., Inc.**, New York; printing press and industrial saws manufacturer; purchased Jones & Orth Cutter Head Co.; price about \$800,000.

**Narmco Metlbond Co.**, Costa Mesa, Calif.; expanding facilities for the manufacture of Multiwave, a recently developed flexible sandwich type core material.

**Penn Metal Co., Inc.**, Parkersburg, W. Va.; 20,000 sq ft plant addition.

**Kennametal Inc.**, Latrobe, Pa.; manufacturer of cemented carbide products; purchased 1200 acres near Latrobe for expansion of manufacturing facilities and to decentralize.



AWKWARD process of welding downhand fabricated large pieces is a thing of the past at Dravo Corp., Pittsburgh. Welder now sits comfortably on the end of the electrode carrying boom. Piece is rotated by power driven rolls.



# WARNER & SWASEY TURRET LATHES

## produce results at Halliburton



*Warner & Swasey 3-A Universal Extra-Heavy Duty Turret Lathe machining closing sleeves for 8 1/2" D. V. Multiple Stage Cementer, made from alloy steel tubing. Tolerances: .002 to .003. These and many parts for Halliburton's Twin T-10 Cementing-Fracturing lo-boy trailer unit, shown above, are machined on Warner & Swaseys.*

**H**ALLIBURTON Oil Well Cementing Company, the world's largest service company to the oil drilling industry, is one company whose particular turning requirements put the highest premium on turret lathe flexibility. That's why they depend on standard-tooled Warner & Swaseys.

In the Halliburton plant at Duncan, Oklahoma, the flexibility of their more than 20 Warner & Swasey turret lathes has been proven out time and again. Sudden demands from their field units—often on an emergency basis—plus frequent design changes for their equipment, put the flexibility of these turret lathes and their standard tooling to a real test. The Warner & Swaseys have met these demands—

turning out the variety of small lots, holding required close tolerances and finishes, and producing at low cost with the very minimum of downtime.

It is significant that the growth of this company has been paralleled by ever-increasing numbers of Warner & Swasey turret lathes in the Halliburton plant. Since the first installation in 1934, they have looked to Warner & Swasey to meet their peculiar turning requirements. An important part of this long-standing business relationship is the prompt service and sound tooling advice provided by their Warner & Swasey Field Representative—service that is available nation-wide.

Filling the specialized turning requirements of machine tool users—

plus the more usual machine shop applications—is our job. Our nearest Field Representative will be glad to work with you to fill your needs. He'll recommend the right machine, with proper tooling, to most efficiently handle your work. Call him in!



**YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS . . . WITH A WARNER & SWASEY**

## TV: Industry Stars On Closed Circuit

**Distance no problem in reaching far flung regions . . . Nationwide presentations expensive . . . But advocates consider results well worth the cost . . . Package service available—By G. J. McManus.**

◆ OVER 30,000 United States Steel Corp. management employees and their wives sat, simultaneously, in 10 different cities watching and listening to company president Clifford Hood speak in New York on the subject of safety.

This was the most recent in a rapidly growing number of closed circuit television programs being put on by industry.

### Costs Are High

Other companies who have taken advantage of this method for breaking the distance barrier include General Electric, which has held six private televiewings this year, General Motors, with three shows, Esso, Sun Oil Co., and Smith, Kline & French Laboratories.

Cost of staging such national presentations is not small. Tab runs anywhere from \$35,000 to over \$300,000. But advocates in-

sist that they offer big savings over meetings which take field men away from their jobs and entail substantial travel expense.

### Useful in Sales

Probably the most frequent use of industrial closed circuit TV is for sales meetings.

What about talking back—two-way communication? It's here, and probably will be used considerably in the future.

Last December, General Electric's Electric Housewares Div., Bridgeport, Conn., had an important policy change. They assembled district people in groups around the country.

The new policy went out in a 20-minute presentation right from the home office. Then there was a one-hour interval while the men digested the information and discussed it in terms of local situations. TV communications were resumed and reversed with field

fellows firing a barrage of questions which received immediate clarification.

The technical side of closed circuit TV is complicated. And it is made more difficult by the fact that practically all of it is on a one-shot basis. Parties usually involved include: the local TV station, the local telephone company for transmitting the signal to and from local points, A T & T for long distance transmission, and special service for setting up receiving sets.

However, there are a number of concerns which will wrap up the whole package. Theatre Network Television, Inc., N. Y., has staged an average of three closed circuit programs per month this year, ranging from two location to 79 location jobs. Box Office Television, Inc., also offers package television service. And Sheraton Closed Circuit Television handled the U. S. Steel safety presentation.

## Have You Considered Closed Circuit Television?

### USES

Introduction of new products.  
Announcement of new policies.  
Inauguration of new campaigns.  
Explaining new technical developments.

### ADVANTAGES

Face-to-face presentation.  
Travel expense and lost work time eliminated.  
Simultaneous announcement to all areas.  
Speakers not distracted by the audience.

### FACILITIES

Several firms available to handle the entire package.  
Hotels and other gathering places in large cities are equipped with screens and necessary cable hook-ups.  
Large screen receivers—12 to 20 ft—are available.  
Color TV cable goes out to nearly entire telephone system.

### COST

Camera work (average)—\$1000 per show.

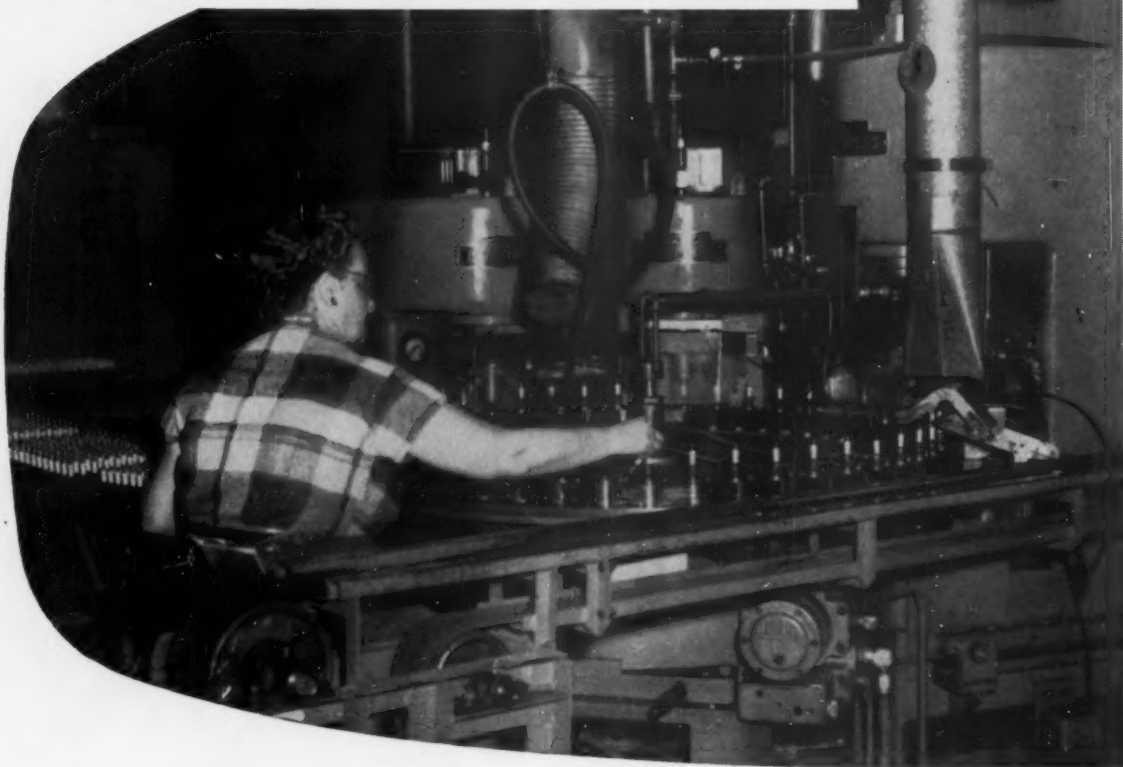
### Transmission:

All points in same district:  
monthly charge—\$175  
installation—\$10  
equalization—\$15  
mileage charge (one day, 7 1/2 miles)—\$90.

Points in different districts—charges listed above at both points plus:

station pickup charge — \$200 per station  
mileage charge — \$1.15 per mile per hour.

## AUTO-LITE BOOSTS PRODUCTION HYDRAULICALLY...



## MULTIPRESS® installation automates assembly operations

- ★ Sets new safety levels
- ★ Reduces tool and die costs, eliminates down-time
- ★ Improves product quality, provides for future expansion

The installation of seven 48-station Multipresses at the Fostoria, Ohio, plant of Electric Auto-Lite has introduced added efficiency into a critical production stage — final assembly of spark plugs.

One unit with a single operator (1) pre-presses the top gasket of a spark plug to centralize the insulator within the shell; (2) cold forms the shell to anchor the entire sub-assembly as an integral unit; and (3) seals the shell and insulator. These operations had required *three individually operated presses*.

Since Multipress equipment was installed, materials handling has been reduced and tool and die costs cut substantially. Down-time has been virtually eliminated; maintenance can be carried on without interrupting production. Exact control over force application is now possible, with improved product quality control a direct result.

The experience of Auto-Lite is typical of hundreds of companies who have found that a Denison Multipress, with its automatically controlled hydraulic ram, can produce a better product . . . faster, more efficiently, and at less cost. Write for complete details.

**THE  
DENISON ENGINEERING COMPANY**  
1242 Dublin Road • Columbus 16, Ohio  
*A Subsidiary of American Brake Shoe Co.*

HYDRAULIC PRESSES • PUMPS • MOTORS • CONTROLS



# HOW TO RUSTPROOF BLACK PLATE



Rust is a problem anytime, but it's particularly serious with black plate. On this light gauge, dry, uncoated steel, rust can start from a fingerprint. "Sweating" due to sharp temperature changes will cause immediate rusting on surfaces and edges.

Leading mills are now eliminating rust problems by packaging black plate in Ferro-Pak, Cromwell's volatile corrosion inhibitor paper. Chemical vapors from Ferro-Pak form an invisible film around the steel that prevents rust from getting a start, even when moisture is present.

The new Ferro-Pak sheet above was custom-made by

Cromwell's "Paper Engineers" to meet steel mill requirements for shipping black plate and dry sheet steel. It is water-proof, strong, yet highly flexible and easy to handle. Its chemical rust inhibitor is non-toxic . . . compatible with oil . . . stays effective for long periods even when the humidity soars.

Whether you're a shipper or a buyer of steel, it will pay you to specify Ferro-Pak wrapping wherever rust is a problem. For an interesting idea brochure on many uses for Ferro-Pak, write **Cromwell Paper Company, 4803 South Whipple St., Chicago 32, Illinois.**

## FERRO-PAK<sup>®</sup> by Cromwell "Paper Engineers"



**RUSTPROOFING A FREIGHT CAR.** Ferro-Pak is used to line sides of car and to interleave coils, transforming ordinary freight car into huge rustproof package.



## REPORT TO MANAGEMENT

**Will U. S. Tax Policy Change?**

Over the next few months, the House Ways and Means Committee, which originates tax legislation, will investigate all phases of the U. S. taxation policy and its administration. Terms of the investigation are broad enough to include study of the entire tax structure.

The study is not only overdue, but is demanded by almost every segment of the American public. Congressional mail and every type of pressure has been building up in Washington for Congress to do something about the tax structure.

The fact that demand is universal might indicate that Congress will do something about reducing the inequities that exist. But don't count on it, at least not this year.

**Too Much Politics for Action**

The fact that this is an election year will have a lot to do with what happens to the investigation. There's a strong possibility that the investigation may be used as a political sounding board for election year charges, threats and promises. (Possibility? It's a certainty.)

The probe may even be sidetracked into a hunt for tax scandals in the Eisenhower administration, or in the least, a search for political fuel in the Administration's tax policies. This will probably be the fate of what could be a valuable, constructive probe.

**What Revisions Are Needed**

Just about every business organization has stated, or is stating, its position that relief is needed from discriminatory rates that threaten the availability of investment capital—both in individual or corporate taxes.

There is a strong movement toward new emphasis on excise taxes as a more equitable method of raising money for government than the income tax. A lot of evi-

dence indicates that excise taxes aren't necessarily at the expense of the low income brackets to benefit the high income group.

But politics is politics, so don't get your hopes up. The pattern of high income taxes is now firmly entrenched. And a lot of noise can be made of the contention that because of loopholes, unjustness is "more apparent than real."

There is no doubt that loopholes constitute a major cause of resentment against the current tax structure. The National Association of Manufacturers cautions that the great need is for the tax authorities to keep the loophole problem in proper perspective in relation to the high rate problem. After moderating the punitive rates, the NAM says, it would then be possible to appraise constructively the entire tax structure with a minimum of emotion and prejudice.

Emotion and prejudice, however, are the key to the situation. Emotion is high and prejudice strong on congressional tax committees. That's why you can't expect too much action, however much it's needed.

**How's Business in General?**

Up to the time the steel strike hit, most segments of business continued to operate at peak or near peak capacity.

Since the strike, only lack of steel and the usual summer letdown from weather or vacations kept the rate of business activity from continuing at its top pace.

The end of June found the Federal Reserve Board's index of industrial production at 141, down only a point from May, but two full points above the rate a year ago. Output of consumer durable goods was down, however, chiefly because of a 53 point index drop in automotive output.

## INDUSTRIAL BRIEFS

**Atoms in Philadelphia . . .** National Industrial Conference Board has scheduled its Fifth Atomic Energy Conference for March 14-15 to coincide with the Second Nuclear Energy Conference of Engineers Joint Council, March 11-15, 1957, in Philadelphia.

**That's a Lot of Bulldozer . . .** A powerful bulldozer-type machine, designed for moving crashed bombers from runways, has been delivered to the U. S. Air Force by R. G. LeTourneau, Inc., Longview, Tex. The mammoth mover can completely remove a 400,000-lb crashed bomber in less than 20 minutes. The same task, using conventional equipment, formerly required from five to 15 hours.

**No Place to Hide . . .** "Audipage," a new miniature paging device operating on the principle of magnetic induction, has been developed by Philco Corp. Believed to be one of the smallest, high-gain, paging devices yet developed, the one-ounce personal receiver has attracted attention of telephone companies, industrial concerns and the Department of Defense. The device will be distributed by the G. & I. Div. at Philadelphia and will be listed at \$79.50.

**Big Wheels . . .** Motor Wheel Corp. has purchased a 33 acre tract of land near Newark, Del., for construction of a \$3½ million plant to manufacture automobile wheels, hubs and drums.

**Foundryman's Friend . . .** At the San Francisco plant of Federated Metals Div. of American Smelting & Refining Co., phosphor-copper, an important aid to foundryman in the pouring of copper-base alloys, is now being produced for the first time on the West Coast.

**Boardwalk to Broadway . . .** The fall meeting of The Material Handling Institute, Inc., will be held in Atlantic City, N. J., at the Traymore Hotel, Oct. 10 and 11, 1956. The annual meeting is scheduled for Dec. 10 and 11 at the Biltmore Hotel in New York City.

**Consolidating with Consolidated . . .** Consolidated Electrodynamics Corp., Pasadena, Calif., has acquired Electronic Industries, Inc., of Burbank, Calif. Electronic Industries, specializing in etched circuitry development and production, will become a wholly owned Consolidated subsidiary, but will retain its present name and activity.

**What's No. 2? . . .** The Institute of Scrap Iron & Steel Inc., has published its 1956 yearbook. The book contains statistics about the iron and steel scrap industry and specifications for scrap. It also lists officers of the institute, cites the objects of the national trade association and includes its by-laws. The book also carries an alphabetical list of members.

**Texas Tower . . .** R. G. LeTourneau, Inc., Longview, Tex., has a contract to build a \$3,750,000 million off-shore drilling platform for Zapata Off-Shore Co. of Houston, with delivery scheduled for early 1957. The platform will be built at riverside construction facilities on the Mississippi near its Vicksburg (Miss.) plant. It will be floated 400 miles down river and out into the Gulf.

**Cool Deal . . .** National-U. S. Radiator Corp., Johnstown, Pa., and the Union Asbestos & Rubber Co., Chicago, Ill., announced jointly that an agreement has been signed transferring the Air Conditioning Div. of Union Asbestos & Rubber Company to National-U. S. Radiator Corp.

**Hot Pipes . . .** Superior Tube Co., producer of small diameter tubing, is entering the atomic energy field by the creation of a Nuclear Products Div. Occupying plant facilities in nearby Trappe and Phoenixville, the division fabricated sub-assemblies and components used in the core of nuclear power reactors.

**Chemical Reaction . . .** Hooker Electrochemical Co. and Oldbury Electro-Chemical Co., both of Niagara Falls, N. Y., are negotiating for a merger of Oldbury Electro-Chemical Co. into Hooker Electrochemical Co. by the issuance of 450,000 shares of Hooker common stock in exchange for the 10,000 shares of Oldbury presently outstanding.

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**BLUE TEMPERED  
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## Change in Grain Size and Structure Cuts Abrasive Costs 80%

### Grizzly Manufacturing Division grinds 5½ times more brake lining per disc

An 80% cut in abrasive disc costs in grinding brake lining is reported from Grizzly Manufacturing Division of Paulding, Ohio.

Looking for ways to cut costs, their production men called in the Gardner Abrasive Specialist. Could Gardner make discs that wouldn't wear out so quickly?

The new Gardner disc stepped up production from 454,790 to 2,512,200 feet of lining per disc. That's 5½ times more production for each disc! Downtime for disc replacement has been turned into productive time.

125A



# GARDNER

abrasive discs

BELOIT, WISCONSIN, U.S.A.



**AUTOMOTIVE ASSEMBLY LINE**

## Smaller Wheel Hits Production Snags

**Changeover to 14-inch wheel size for 1957 models causes tooling pandemonium among contractors . . . First orders let in April but some withheld until June . . . Replacement market a problem—By T. L. Carry.**

♦ **WHEELMAKERS** are running into some tough production problems brought on by the almost universal changeover in 1957 car models to the 14-in. wheel. The majority of automakers are adopting the smaller wheel to give the public that longer and lower look which it supposedly has been clamoring for.

Not every 1957 model will be using the smaller wheel. Among those that will stick to the 15-in. size are Lincoln, Cadillac, Continental and Buick.

**Huge Retooling Job . . .** Makers of prestige cars feel they don't have to change wheel size to give their cars sales appeal. However, you can bet that by 1958 every producer in the business is going to be using the smaller diameter.

The wheel companies have been faced with the proposition of an almost complete retooling job in order to meet the needs of the automotive customers. And at the same time they've had to maintain equipment to take care of those customers not making the change

plus supplying a certain amount for the replacement market.

Approximately 10 die setups are required to make a wheel. Five of these are used for press operations in forming the wheel disks and another five are needed for combined press and roll operations in forming the wheel rims.

**Some Start Late . . .** Thus, a wheel company that has 12 customers for 14 in. wheels is going to have a minimum of at least 120 dies plus any new dies that are needed for different types of wheels used by the same customer.

Production tooling for the first smaller wheels was released about last April and work on the new programs has been progressing steadily ever since. But some releases were not obtained until late last month. Getting the proper dies requires anywhere from 90 to 120 days so wheel builders are looking forward to some extremely busy days ahead.

Research on the smaller wheel has been going on now for about 2 years. Although actual production may not begin for at least another month, vendors are at the point where they are making samples in pilot runs in order to get all the bugs out of the production lines.

**All For ½-Inch . . .** Actually, the cars with the smaller wheels aren't going to be much lower but they will look that way. Here's why:

Reducing the diameter of the wheel 1 in. will only lower the car ½ in. because the radius of the

## Willys Sires New Army Mule

■ Willys Motors, Inc., will soon start production of a new tactical vehicle for Army Ordnance. Called the Mule, it is the first such vehicle to be added to the military procurement program since the Jeep was developed early in World War II.

The contract calls for delivery of the first vehicle within a year and is worth approximately \$3.5 million.

Willys says that tooling for the initial order will start immediately.

The vehicle was designed by Willys under supervision of Army Ordnance engineers at the Detroit Arsenal for off-the-road use in forward combat areas and for airborne troops.

The Mule is 100 in. long and 46 in. wide and can be transported by helicopter or dropped by parachute. It has the lowest silhouette of any military vehicle (27 in.) and can climb a 72 pct grade when fully loaded. Although it weighs only 750 lb, it can easily carry a 1000-lb load.

The vehicle also has a unique train feature. Once adjustments are made to engines and steering mechanisms, an entire line of the tiny carriers can be driven by one man.

In addition to its use as a cargo carrier, the vehicle can also be used as a mount for the Army's 106 millimeter recoilless rifle.



# How New Chromium plating process solves problems for two companies

◆ "Crack-Free" Chromium gives washing machine shafts solid protection from rust

◆ Manufacturer eliminates undercoats for die cast hardware with new Unichrome process

Unichrome Crack-Free Chromium Plating is proving superior to ordinary chromium in certain types of applications . . . especially where durability and protection are at stake.

## PROVES IDEAL IN WASHING MACHINE

Steel drive shafts in well known washing machines are now plated directly with Crack-Free Chromium about .0005" thick. Unlike *ordinary* chromium, this deposit has no microscopic cracks to admit water, humidity, soap and detergent spillage. Shafts stay rust-free, and get extra wear-resistance besides.

## ONE-STEP PLATING OPERATION

Chromium was the finish wanted for new line of zinc die cast cabinet hardware. Also wanted was a process that would permit the company to get into immediate production with an existing tank. Unichrome Crack-Free Chromium satisfied both needs. The company now plates directly on the castings, eliminating copper and nickel plating stages, extra handling, and need for major new equipment. The matte gray finish is buffed up readily to high lustre.

*This is just one of many Unichrome developments in processes, equipment and materials which provide opportunities to cut your finishing costs . . . opportunities to turn out a better product through a better finish. We'd welcome the chance to work with you.*

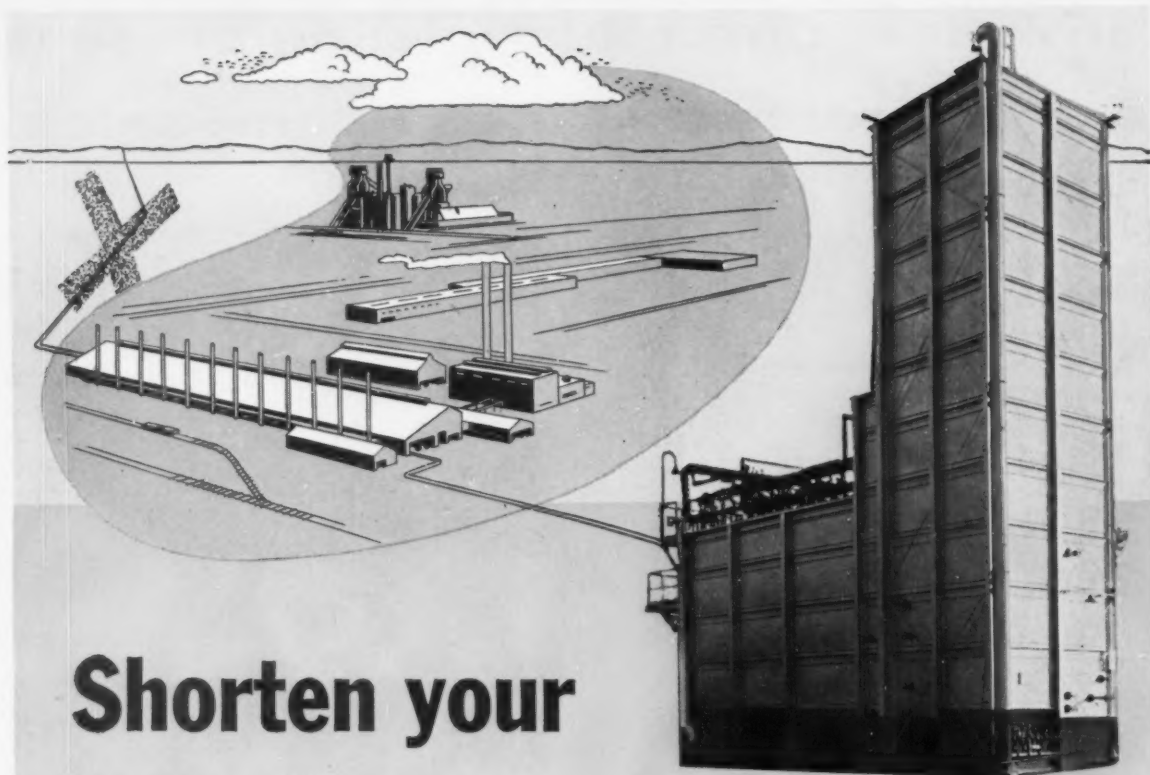


PLATING MATERIALS  
ORGANIC COATINGS  
TIN & TIN CHEMICALS  
CERAMIC MATERIALS  
RADIOGRAPHIC EQUIPMENT  
WELDING SUPPLIES  
METALS & ALLOYS  
HEAVY MELTING SCRAP



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# Shorten your OXYGEN supply line with *Air Products* "ON-LOCATION" GENERATORS

**T**he shortest distance between the source of a material and its application is usually the most economical. Increasing use of oxygen in steel-making, for instance, strongly favors "on-location" generators in contrast to all off-premises sources. "On-location" means *on the job* continuously, completely under your own control, and at lowest cost.

We will provide and install an "on-location" oxygen and/or nitrogen generating station to suit your present and expanding oxygen requirements. This can be done on a lease basis, *without capital investment by you*. Operation and maintenance can be handled by you or by Air Products—at your option—with price guaranteed at all levels of consumption.

We design and manufacture generators for unlimited quantities of oxygen and nitrogen regardless of size, purity or cycle.

Give us information regarding your present and contemplated uses of oxygen and nitrogen. We will then give you a close estimate of the savings you can make with Air Products Oxygen and/or Nitrogen Generators installed at your plant.

More than 700 successful installations.

**LOW COST OXYGEN...NITROGEN**

***Air Products***  
INCORPORATED

Dept. I, Box 538, Allentown, Pa.

## **Automotive Production**

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
JULY 21, 1956	123,255	23,856
JULY 14, 1956	122,386	23,787
JULY 23, 1955	178,784	29,629
JULY 16, 1955	177,260	30,367

\*Estimated. Source: Ward's Reports

wheel from the axle to the ground will only be  $\frac{1}{2}$  in. less.

Stylists will, however, be able to take advantage of the whole wheel and, although the cars won't be much lower than they are this year, they will have the appearance of hugging the ground because of a lower belt line.

## **New Painting System**

Two new flow-coat paint systems for applying prime coat to sheet metal parts are now in operation at the Pontiac Motor Div.

The systems are used for preparing parts for finish coats of lacquer. Previously, Pontiac dipped sheet metal sections in a giant tank of prime paint.

With the new method, parts pass through a paint section by conveyor and are uniformly sprayed with a prime coat which is applied through 80 nozzles.

The parts then pass through a drip area and are carried into ovens where they are baked at 375° F. for 75 minutes. The ovens have a combined output of 22 million BTUs per hr.

The new systems employ the latest fire protection methods. If a fire starts, the entire paint area will be automatically smothered in carbon dioxide within a matter of seconds. In addition, the new systems have a built-in safety feature in that they eliminate open tanks of prime paint that were used when the parts were dipped.

## **Ford Stresses Growth**

The new Ford assembly plant that will be built near Lorain, O., reflects the growing need not only for Ford but for the whole automobile industry for bigger and more flexible operations.

According to R. S. McNamara, Ford Div. general manager, the number of Ford body styles has more than doubled over the past few years. In addition, the demand for an increasing amount of optional equipment has grown by leaps and bounds.

Thus, the company was literally forced to seek a site for a new plant to meet what it considers the growing requirements of the market.

The new plant will cover 1.5 million sq ft and will contain separate manufacturing facilities for both cars and trucks.

Its capacity, on a 2-shift basis, will be 960 vehicles daily.

Construction will start as soon as bids have been let to contractors. The plant is expected to be in operation some time in 1958.

## **Dealers:**

### **House subcommittee amends franchise bill.**

From here, it looks like automobile dealers are going to get their day-in-court bill passed into law by this session of Congress.

## **AUTOMOTIVE NEWS**

But what the dealers want and what they will finally get in the way of legislation are going to be two very different things.

Latest action by the House Judiciary Subcommittee makes the bill more palatable to manufacturers and not so much to the liking of dealers.

The subcommittee has taken the Senate-passed version of the bill and added about 12 amendments to it which are aimed at eliminating the vagueness and catch-all effects of the Senate version.

Thus, although a dealer could still sue a manufacturer for failing to show good faith in carrying out franchises, he would have a tough time proving just what "good faith" is.

As the bill now stands, it specifically states that recommendation, persuasion or argument should not be considered as constituting a lack of good faith.

So, although the bill may get on the books this year, its worth to dealers will be questionable.

## **THE BULL OF THE WOODS**

By J. R. Williams



# For general all 'round gaging

## You can't beat a **Dial Indicator**



With all the fanfare about new and fancy gaging systems, the Dial Indicator is today the most universally used visual gaging instrument. It is exceedingly economical and practical because —

**It is the most adaptable means of gaging**

**Low in first cost, and maintenance**

**No bothersome electric cables or air tubes; no problem of dirty air lines, filters, etc.**

**Dependably accurate up to .0001" and sometimes to .00005"**

**Faster than a fixed gage**

**Shows at a glance how you are doing**

**Requires no expensive special masters**

Federal Dial Indicators outsell all others, for Federal is the most complete line in the world. You can get anything you need in magnification, range, size, and style. There are specially modified Indicators — shockproof, wetproof, superaccurate — and all wanted attachments. Our Catalog tells the whole story. Ask for a copy today.

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## And for a Dial Indicator

## You can't beat a

# FEDERAL

*Ask* **FEDERAL** *First*

FOR RECOMMENDATIONS IN MODERN GAGES . . .

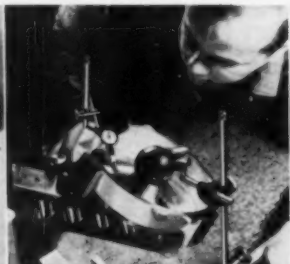
Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting, or Automation Gaging



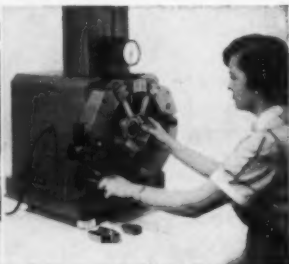
Two Dial Indicators measure thickness of sheet glass close to its edge. Equipped with magnetic maximum hands, one registers maximum and the other minimum thickness. Rollers contact both sides of glass to assure smooth movement.



Model 88P Gage uses Dial Indicators graduated .001", .0005" and .0001" to inspect accuracy of shallow diameters, either I.D. or O.D. Gage is adjustable for various diameters and for height.



Two Federal Testmasters check the flatness of the cone surface of a water meter housing mounted on a Sine Bar and the height of the ball with reference to the surface.



This Gage employs dead weight pressure in two directions to check by a single .0001" Dial Indicator the radial play of assembled ball bearings.





## Behind the Armed Forces Manpower Rift

**Climbing costs of defense force demand for cuts in service manpower . . . This year's 36 billion won't be enough next year if costs keep climbing . . . Joint Chiefs fight forced cuts—By G. H. Baker.**

♦ **HIGH-PRICED** national defense is causing grave concern among top-level officials in Washington.

Despite the "controlled inflation" that has pushed up the cost of everything the government buys, the Eisenhower Administration has been successful thus far in holding its annual military spending budget at around \$36 billion.

This feat has been possible because of a nest-egg of carryover procurement funds remaining from past fiscal years. Now, the nest-egg is about used up. Starting next year, the Army, Navy, and Air Force will have to live on the year-to-year money that Congress appropriates.

**Manpower Cuts . . .** There's been much furore kicked up lately because Admiral Radford, Chairman of the Joint Chiefs of Staff, has suggested gradual reductions in Army, Navy, and Air Force manpower over the next four years, in order that the Defense Department may live within its budget. The Joint Chiefs are reluctant to make these reductions in personnel strength, but they are under orders from Defense Secretary Wilson and Treasury Secretary Humphrey to carry out a program of gradual reduction in strength as the alternative to asking Congress for substantial increases in the total military budget.

To keep the Army, Navy, and Air Force going at their present strength in the next fiscal year will require an appropriation of about \$48 billion — up \$12 billion from the present \$36 billion — in the next fiscal year. But Defense Sec-

retary Wilson and Treasury Secretary Humphrey have told the military chiefs that this \$48 billion figure is "way out of sight." Go back and do some more figuring, Wilson and Humphrey told the military chiefs, and come up with a figure of not more than \$40 billion.

**How Big a Cut . . .** As a result of this mandate from Wilson and Humphrey, the Joint Chiefs of Staff are reluctantly suggesting several alternate plans, all of which call for gradual reductions in manpower over the next four years. The smallest of these plans calls for a reduction of 300,000 men and the largest proposed dropping 800,000 men before 1960.

One thing is certain: National

defense costs are not going to decline in the foreseeable future. The higher prices of steel, copper, and aluminum guarantee that almost everything the government buys is going to cost more, not less. The thankless task of economizing that Messrs. Wilson and Humphrey are trying to carry out simply involves an honest attempt to keep defense costs from going sky-high by the device of trimming out excess personnel. It is this move that has inspired the so-called "revolt" of the military chiefs of staff.

**Labor Costs Climb . . .** Production costs of aircraft and guided missiles will climb sharply in 1958, if firms in this work grant the "substantial" wage increases that the AFL-CIO Machinists' union

## A Challenge to Labor's Political Spending

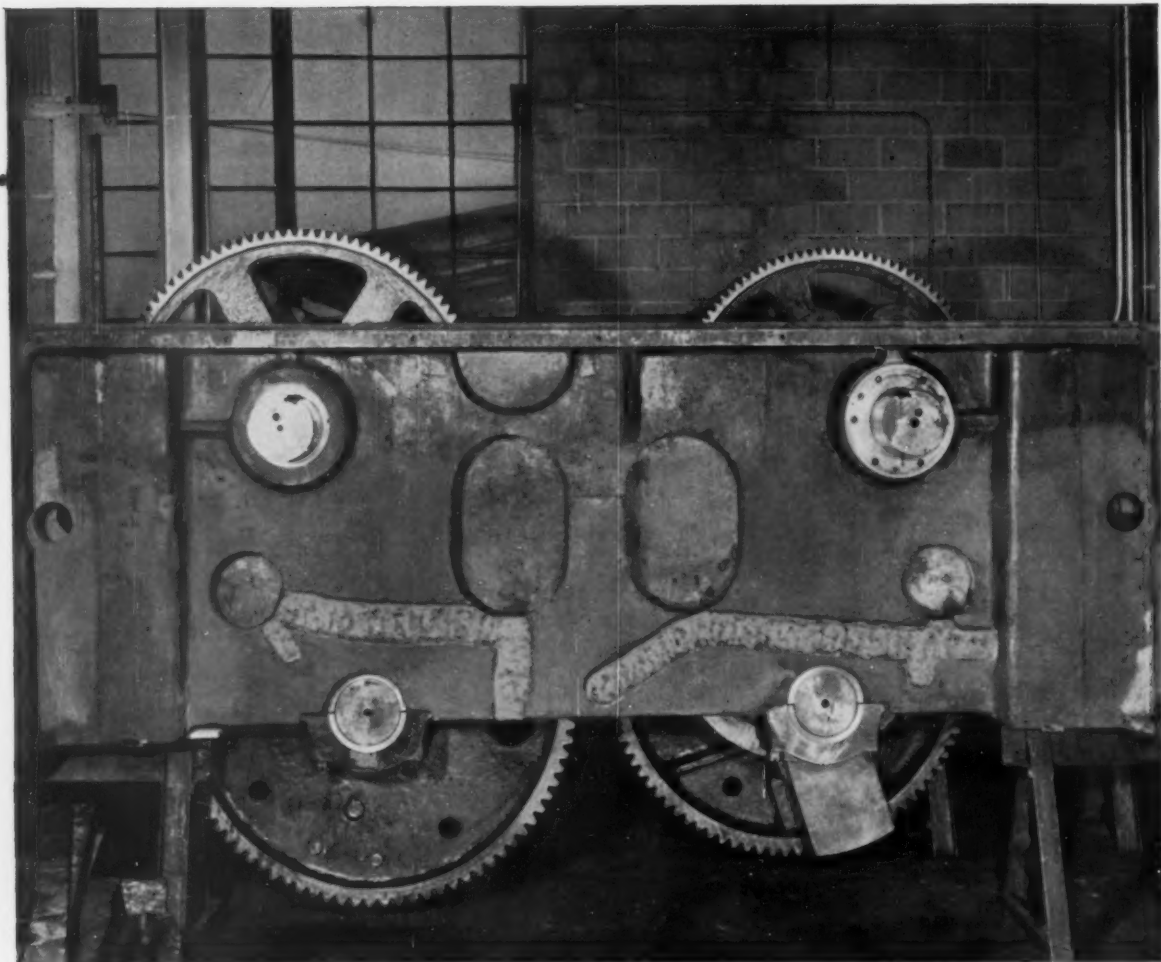
■ **A Senate Republican demands that Congress make it illegal for union leaders to spend dues money on political candidates against the wishes of the union members.**

**Sen. Barry Goldwater, R., Ariz., says the Michigan CIO Council is asking Michigan union members to subscribe to the Democratic Digest, an official propaganda organ of the Democratic party.**

**"How much in compulsory union dues was used to pay for these letters, subscription blanks, reply envelopes, and postage?" Goldwater asks in the Senate.**

**"I wonder how the Michigan CIO Council would react to the mailing of the Republican newspaper, *Straight From the Shoulder*, to its membership? Would the same cooperation exist? I doubt it, since it is no secret that the CIO has taken over the Democratic party in Michigan."**

**The Senate has not yet acted upon Senator Goldwater's request for legislation to slow down the union leaders' spending.**



Two of the braze welds made in this big press crown with ANACONDA-997 (Low Fuming) Bronze Rod. All four cast-iron partitions in the crown were repaired.

## After other repairs failed, Braze Welding with Anaconda Rod restored this iron press crown

When this 16-ton crown of a double-action press first failed, it was repaired by electric arc-welding using a high-strength nonferrous electrode. This joint failed.

The Punch Press Repair Corporation of Ferndale, Mich., cut out the old welds and braze welded all four of the cast-iron partitions in the crown, using a total of 800 pounds of  $\frac{3}{8}$ " ANACONDA-997 (Low Fuming) Bronze Welding Rod.

Its useful life extended, the press is back in active service at the plant of a large tool and die firm in Detroit.

ANACONDA-997 (Low Fuming) Bronze is a superior welding rod used to join gray and mal-

leable cast iron, steel, and copper alloys by the oxyacetylene process. It is one of a broad line of Anaconda Welding Rods that are finding increasing applications in production and repair welding. Anaconda Welding Rods are sold by distributors of welding equipment everywhere.

See your Anaconda distributor or write: The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

06109

**ANACONDA<sup>®</sup> WELDING RODS**

*Sold by distributors of welding equipment everywhere*

says it will insist upon.

Officials whose job it is to keep a close watch on procurement costs are fearful that some contract costs may be jacked up alarmingly if the 350,000 members of this union who work in planes and missiles are successful in enforcing their demands upon management.

Leaders for the Machinists' union say the aircraft and missiles makers can well afford to pay "substantial" wage increases. In addition, the union will demand uniform wages throughout the industry, a full union shop, better health and welfare programs, and a job protection program for workers whose plants are relocated.

The leaders also say they hope to build their national strike fund to \$15 million within the next two years. Then, if they are "forced" to take a strike, they'll be in a position to pay some of this money back to the strikers.

### Mesta Takes Over

Sale of the government-owned foundry and machine shop at New Castle, Pa., to Mesta Machine Co. was completed July 19.

Mesta was high bidder at public auction April 20 with an offer of \$8 million payable over 20 years, with \$500,000 down and interest at three pct on the unpaid balance.

The installation consists of 15 major and minor buildings, including a foundry, machine shop, welding shop, and four openhearth furnaces. It occupies a 50-acre site.

As an essential defense plant, it is being sold under the provisions of the National Industrial Reserve Act, which prevent a buyer from selling machinery and equipment essential to mobilization requirements. Conversion of the plant to other uses is also prohibited without consent of the Secretary of Defense.

### Atomic Rules Eased

Securities and Exchange Commission is easing its registration requirements to exempt non-profit companies organized to develop atomic power.

The action, vigorously urged by industry to remove one of the roadblocks to speedier nuclear develop-

ment by private firms, applies to projects primarily engaged in research and development, and does not pertain to power companies with generating facilities.

Under the old rules, a group which bands together to build a nuclear reactor and sell the heat or steam to a power generating company, was regulated under the Public Utility Holding Company Act.

As a result, an electronic manufacturing firm which joined an experimental nuclear power group would have all of its operations subject to SEC regulation. This has held up private nuclear power development, industry complains.

SEC's action follows the general line of a bill now pending in Congress.

## Atomic Ship:

Ready to Go  
With Congress OK.

The world's first atomic-powered merchant ship, a prototype of things to come, has been approved by Congress and work on preliminary design of both the reactor and

## WASHINGTON NEWS

the hull will get underway soon.

The ship — which is not the President's proposed "peace ship" — will cost about \$40 million and may be either a tanker or a cargo ship. An appropriation to finance the ship will be necessary later, but the Atomic Energy Commission, which will be responsible for having the ship's power plant built, and the U. S. Maritime Commission, which will design and contract for construction of the hull, both have money now to start.

### Working Ship

Under the legislation, the prototype A-ship must be capable of "providing shipping service on routes essential for maintaining the flow of foreign commerce of the United States."

Congress has flatly refused to build the President's show ship, criticizing it as wasteful because it would use the outmoded power plant of the atomic submarine *Nautilus* and would not advance atomic know-how.

## FTC Cracks Down on Monopolies

◆ FEDERAL TRADE Commission, spurred at least a little by congressional criticism over the past few years, is stepping up its enforcement of anti-trust and fair competition laws.

Records for the fiscal year ending June 30 show that the Commission's anti-monopoly complaints rose by almost 17 pct from the previous 12 months, amounting this year to 42. In addition to formal complaints, there were 40 cease and desist orders issued in the anti-monopoly area, an increase of 10 over the previous fiscal year.

In the merger field, five complaints were issued, the same number as in the previous 4½ years. In addition, the Commission issued the first cease and desist order under the new anti-merger act, and is considering a second.

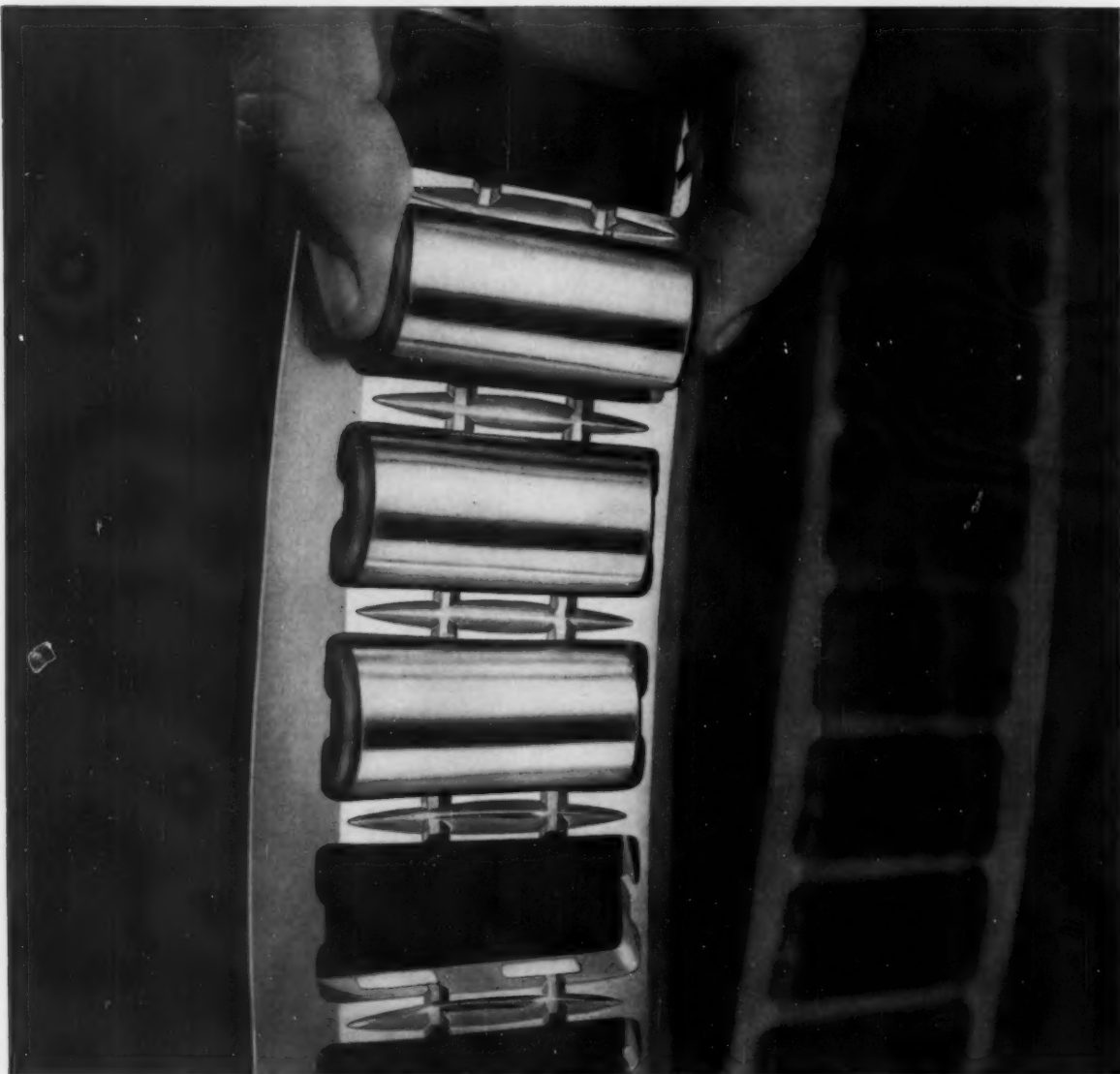
Most of the Commission's activity in fiscal 1956, however, was in

stamping out deceptive business practices, including phony claims for products, fake pricing, and "bait" advertising. Some 150 formal complaints and 133 cease and desist orders were filed.

This was an increase of 25 complaints over the previous fiscal year, and 80 pct above the 1944 to 1953 average. The 133 orders issued compares with 82 cease and desist orders filed in the previous 12 months.

Complaints issued under the Robinson-Patman Act, which is designed to prevent firms from driving their competitors out of business by unfair methods, totaled 27 in fiscal 1956, an increase of 50 pct over the previous fiscal year. Twenty-three cease and desist orders were issued under the R-P Act, an increase of nine over the previous 12 months.

# TORRINGTON TAPERED ROLLER BEARINGS



## Accurately caged...to cut your costs!

The one-piece, cast-bronze cage you see above is one of the reasons why TORRINGTON Roller Bearings give long, low-cost service. Note the individual roller retainment, for example. This helps keep the rollers thoroughly lubricated at all times. Race surface inspection is simplified. The machined pads in each roller pocket make sure the rollers are guided accurately at the pitch line. All this to minimize wear...lengthen bearing life.

Yes, TORRINGTON Roller Bearings cut your costs. They're made of the finest bearing quality steel available, heat treated by the most modern methods. No wonder they're so rugged...so dependable. Specify TORRINGTON *Tapered* or *Cylindrical* Roller Bearings for heavy loads and low maintenance.

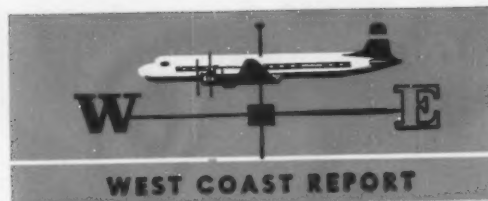
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Needle • Ball • Needle Rollers





## Jetliner Orders Speed Up Industry

**Convair's \$200-million contracts for short-range jetliners mark beginning of new domestic market . . . Foreign competition expected to be tough . . . Bonanza in sight for subcontractors—By R. R. Kay.**

♦ **ORDERS FOR 40** short-range jet airliners placed with Convair by two major airlines just about guarantee that air travel time between major U. S. cities will be cut in half within two years.

With the signing of contracts totalling \$200 million by Trans World Airlines and Delta Air Lines for Convair's speedy Golden Arrows, you can expect more multi-million-dollar orders to come soon.

Flight time from New York to Chicago, for instance, will be reduced from three hours to one hour and 25 minutes, the airlines say.

**Opportunity Knocks . . .** These new orders will keep metalworking shops across the country humming along for a good many years. Deliveries will begin in 1959-60. Many thousands of the aircraft industry's 50,000 subcontractors and suppliers will get in on some of this sure-to-come work. They're already in line for a healthy share of the \$1.5 billion in jetliner orders now on the books for the long-range jobs: Boeing's 707 and Douglas' DC-8.

West Coast planemakers dominate in a big way the world market for both piston and turbine-powered transports. Of the 1175 planes now on order for airlines throughout the world, the industry here has firm contracts for 1025, a giant 87 pct. Cost: \$2.5 billion. Deliveries will continue into 1961.

**Britain Competes . . .** More short-range jetliner business from

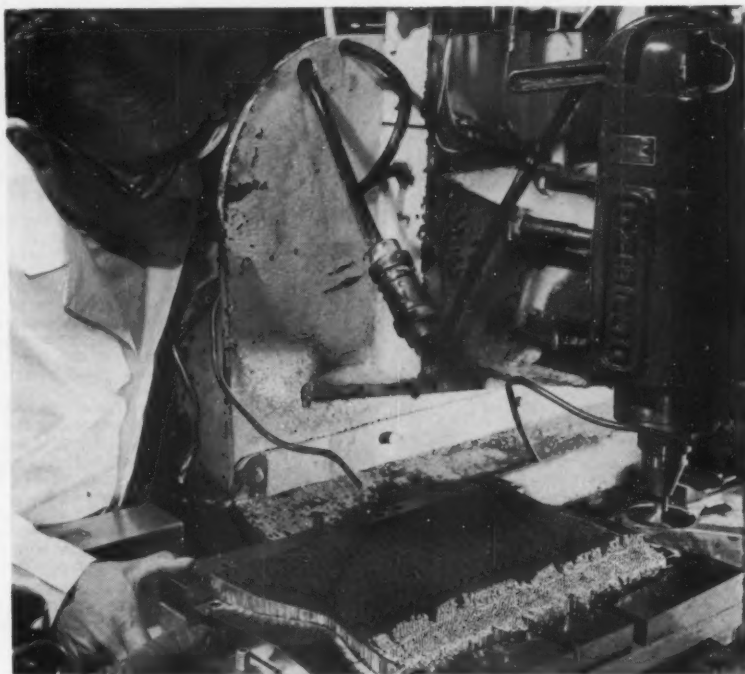
U. S. and foreign flag lines is in sight. However, our planemakers won't find this type of plane easy to sell. Their British counterparts aren't sitting around weaving gaily-colored baskets. They're offering stiff competition.

So far, Convair's Golden Arrow is the only U. S. model on the scene. It'll be built in San Diego. Boeing says it's considering a smaller four-engine version of its 707 for 150-1000 mile jumps with 40 to 60 passengers at speeds up to 600 mph. And Douglas is talk-

ing about a DC-9 to do a similar job.

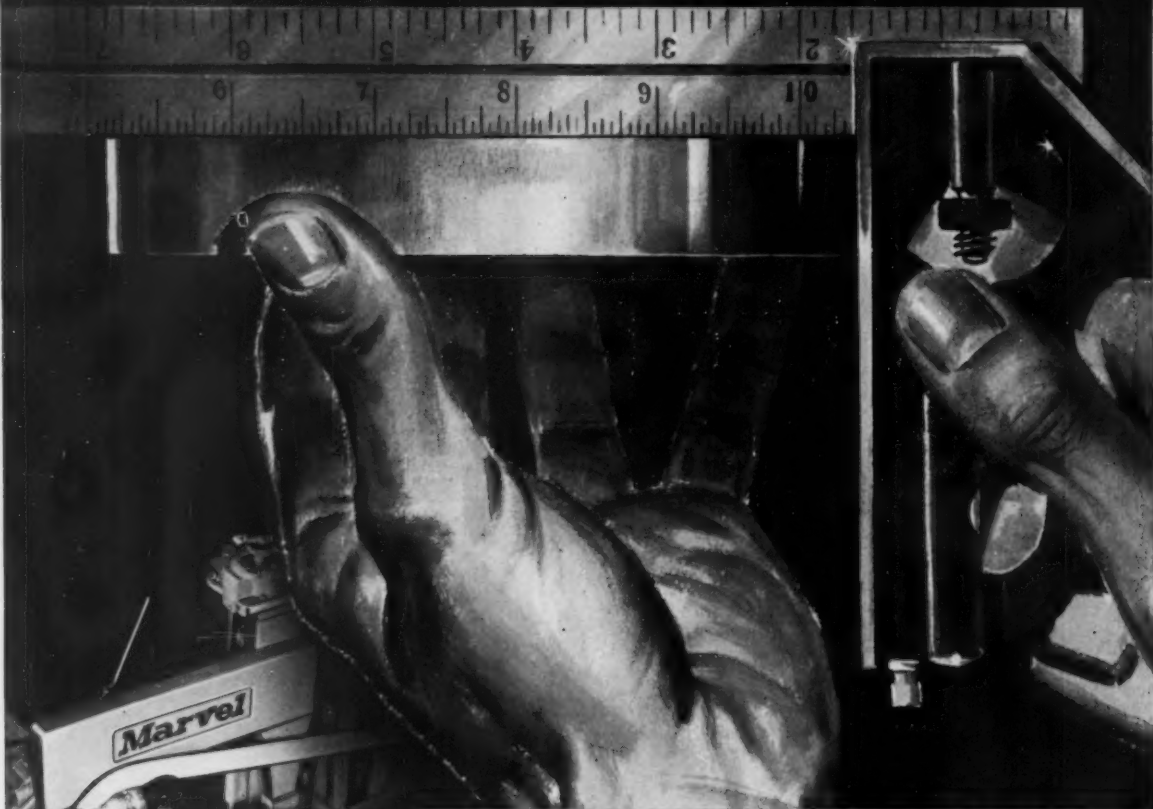
**Speed Plus Beauty . . .** What's the Convair entry like? It'll be a honey, with gold-colored anodized aluminum skins. Forty planes are on order: Trans World Airlines, 30; Delta Air Lines, 10. Cruising speed of 609 mph will make the ships faster than the larger Boeing and Douglas planes, Convair says.

These swept-wing jets will have ranges from 200 to 3000 miles.



**COLD CUTS** mean more to Northrup Aircraft machinists than something to eat. Refrigeration device, at left, freezes water in fragile metal honey-comb part; allows machine to mill it as readily as solid steel.

## IN CUTTING-OFF OPERATIONS...



### ...SPEED WITHOUT ACCURACY IS COSTLY!

Efficient cut-off of steel blanks from bars demands a combination of speed and accuracy. MARVEL, and MARVEL alone, achieves this combination with machines capable of delivering feeds and speeds which fully utilize the strength and heat resistance of the modern high speed hack saw blade.

MARVEL dual power feed and crank lever method of reciprocation are two exclusive features designed to give increased speed and efficiency. This unique dual power feed employed on the Series No. 6 and No. 9 MARVEL Ball Bearing Hack Saw Machines, simultaneously controls both positive feed depth and feed pressure, automatically adjusting both pressure and depth of feed correctly in proportion to the number of teeth in contact with the work. This automatically forces the blade to cut as deeply as possible and practical on every stroke, without demanding the attention of the operator. As a result, the work is cut-off in the fewest possible number of strokes. Quick return of the saw frame on the non-cutting stroke, accomplished by the crank lever, delivers 33 1/3% more cutting strokes per minute without increasing the blade velocity on the cutting stroke.

Accuracy is assured by the construction of the machine itself. Anti-friction ball or roller bearings are used at all load carrying points. The saw frame reciprocates on fully enclosed special design ball bearings which are factory adjusted with a pre-load, assuring permanent frictionless rigidity. Saw frame, saddle, and upright are precision machined and fitted to form a rigid integral unit capable of withstanding any cutting load with no deflection or side movement.

These exclusive features found only in MARVEL Hack Saw Machines, together with the unequalled performance of the unbreakable MARVEL High-Speed-Edge Hack Saw Blade, form a team that guarantees the fastest, most accurate cutting-off.

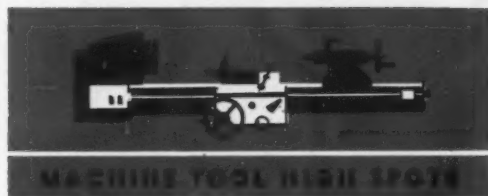
5-1300

There is a MARVEL field engineer near you capable of intelligently discussing your cut-off work. Send for catalog C-55, and the name and address of your nearest MARVEL field engineer.

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## Builders Selling Bigger Italian Market

**Italian industry imports half its machine tools . . . Germany now supplies biggest volume . . . U. S. first on a value basis . . . American special equipment considered tops—By E. J. Egan, Jr.**

♦ **ITALIAN** metalworking industrialists estimated that about one-half of the machine tools they use are made outside of Italy. U. S. equipment is well represented, enjoys a favorable reputation. America's foreign aid program after World War II is responsible for a heavy share of machinery in current use.

But there have been ups and downs in U. S. machine tool exports to Italy.

**Germany Moves Up . . .** For example, in 1950, American builders supplied more than two-thirds of Italian imports of metalworking machinery. Then, aid programs slumped off, and Germany took over the No. 1 spot. As recently as 1954, hard selling German builders supplied 50 pct by volume and 42 pct by value.

But according to 1955 figures, U. S. firms appear to be edging out the Germans, at least on a value basis. Chief reason for the switch-back seems to be the unquestionable superiority of heavy-duty, high-production American equipment.

In so-called standard tool types, Italian builders now give their German rivals competition.

Italian industrial output has been expanding at a rate of about nine percent annually. American builders are taking advantage primarily in special equipment categories.

**"Situation in the Boot" . . .** Italy's own machine tool industry centers chiefly in and around Lom-

bardy and Piedmonte. There are about 150 builders, and some 60 of these are estimated to account for 90 pct of total industry capacity.

At full production, Italian builders could probably turn out 17,000 equipment units a year, or about 30,000 tons of machinery.

But right now Italian builders are only working at about 70 pct of capacity. There's been some softening in their domestic markets recently despite the nation's overall economic expansion. And they're not out of the woods altogether when it comes to German, British and U. S. competition for sales at home and overseas.



**Trouble . . .** Italian builders had some rough export troubles last year, carrying over from 1954. This is in contrast to the relatively prosperous 1951-1953 period, when due to the Korean War, British and U. S. factories gobbled up everything they could get. What wasn't sold to the Americans and British went to Argentina and Brazil. Today, Argentina is Italy's major export market for machine tools.

**School Days . . .** School bell will ring for several hundred key sales personnel of U. S. builders and distributors on July 30. From then through August 3, students at this year's Machine Tool Sales Conference will hear top notch lectures on better ways to sell more metalworking equipment.

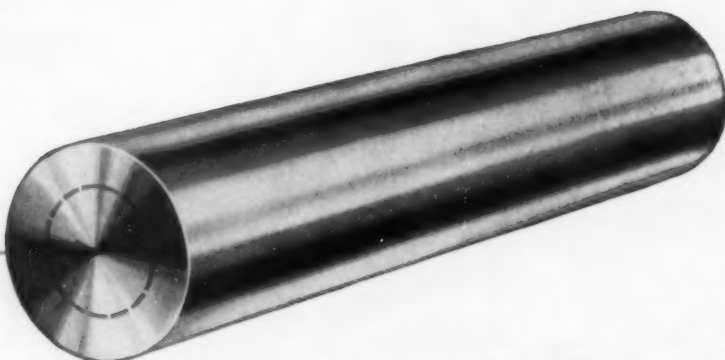
Faculty of 20 experts will assemble at Purdue University, Lafayette, Ind., to conduct the Conference, sponsored jointly by National Machine Tool Builders' Assn. and American Machine Tool Distributors' Assn.

Educational director will be Prof. Harry J. Loberg, director of Cornell University's Sibley School of Mechanical Engineering. His assistant: Prof. O. D. Lascoe, Dept. of Mechanical Engineering, Purdue University.

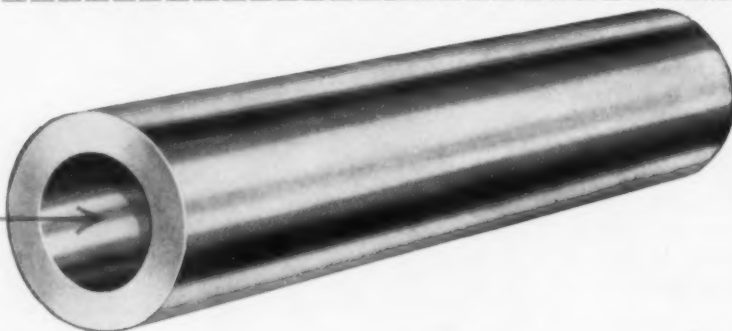
Sales conferees will also hear from NMTBA president Louis Polk, president and board chairman of Sheffield Corp.; and Henry R. Hanson, AMTDA president and vice president of William K. Staments Co. Round table discussions will fill out the conference program.

# Buying bar stock for hollow parts?

Why pay for all  
this steel



When you can  
start with this?



## Buy TIMKEN® seamless steel tubing

If you're making hollow parts, and bore cut *solid* bar stock, you're paying for steel you don't use. But Timken® seamless steel tubing comes with *the hole already there*. You pay only for steel you use. On top of this saving, you cut machining costs. By eliminating that unnecessary boring operation, you free part of your screw machines for other jobs—add machining capacity without adding

machines.

Our engineers will be glad to recommend the most economical tube size for your hollow parts job. By studying your problem and making recommendations, they'll save you money—and the Timken seamless steel tubing they suggest will be guaranteed to clean up to your finished dimensions.

The piercing process by which Timken seamless steel tubing is

made is basically a forging operation. You get *fine forged quality*—a uniform spiral grain flow for greater strength, and a refined grain structure. And through our rigid quality control uniform quality is maintained from tube to tube, heat to heat and order to order.

The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

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SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING





## The Iron Age

# SALUTES

**Martin K. Schnurr** His status as a standard-bearer among independent steel firms evolved from years of business experience. As president of Rotary Electric Steel Co., his theories on competition have proved sound.

Genial Mike Schnurr, president of Rotary Electric Steel Co., is industry's "Jack-The-Giant-Killer." He has many tested theories on how small firms can compete with the titans and "run circles around them" in the process. Because his plans work, Mike has come to be regarded as one of the nation's champions of small business.

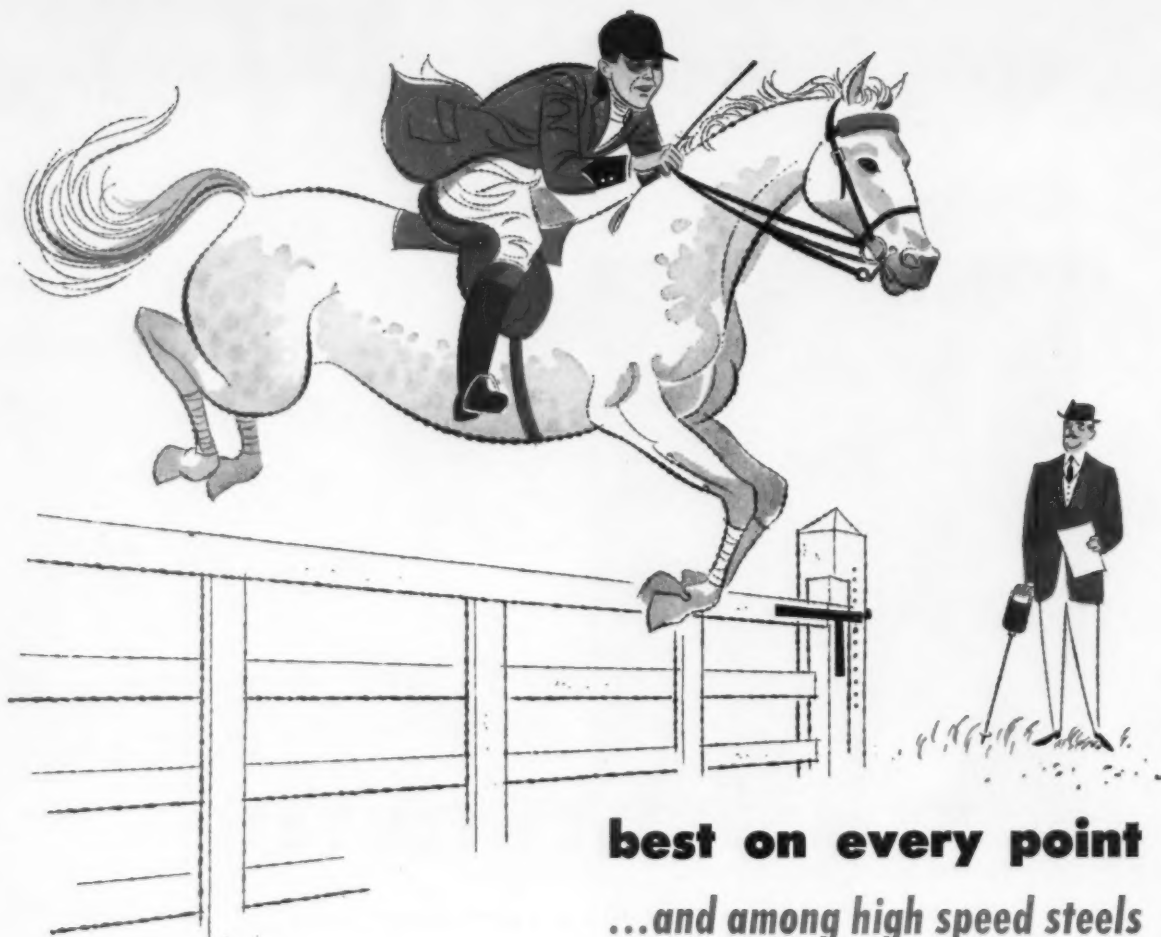
His David versus Goliath approach to independent steel firms' competitive problems is not intended for total war. On the contrary, he believes that big companies make life easier for smaller ones in many ways. The subject is a favorite in his speechmaking repertoire. The industry recognizes his talent and elected him a board member of the Iron and Steel Institute.

A resident of the Detroit area, Mike Schnurr reserves some of his energy for community affairs. In Warren Township, where his plant is located, he was instrumental in organizing the Chamber of Commerce—served as its first president.

The story of Mike Schnurr's life is a contrast to the one-company pattern of success followed by so many executives. Born Martin K. Schnurr, in Baton Rouge, La., he came North at an early age. During his youth, his boundless energy made a restless student of him. He left Columbia University before graduating and went to work for International Business Machines Corp. in 1922, as an auditor.

His enthusiasm and superlative administrative ability carried him up through management-level positions with five firms during the following 25 years. By the time he joined Rotary Electric in 1949, he had acquired valuable financial experience and developed a keen aptitude for market analysis.

His willingness to take the calculated risk and his perennial optimism are big factors in his degree of success. He predicted 1956 would be the stainless steel industry's second best year and is betting on five years of continued good business. If Mike Schnurr says so, that's the way it's likely to be.



**best on every point**  
*...and among high speed steels*  
**the top performer is REX**

To leap the hurdle of competition, a product needs performance born of quality. And Crucible's REX® high speed steel has it — in accurate size . . . sound uniform structure . . . dependable response to heat treatment . . . optimum tool performance.

Now, thanks to improved manufacturing techniques, REX is even better — more uniform. Put it to work on your next job, and you'll quickly know why REX is today, as it has always been — *the standard by which all other high speed steels are compared.*

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## The Iron Age INTRODUCES

**Richard L. Lindland**, elected president, **Campbell, Wyant & Cannon Foundry Co.**, Muskegon, Mich., a div. of **Textron, Inc.**

**Maynard H. Patterson**, elected vice president and general manager International Div., **Minnesota Mining & Manufacturing Co.**, St. Paul, Minn.; **Kenneth J. Shea**, appointed vice president and general manager, **3M's** Canadian subsidiary.

**Jack J. Begley**, named vice president, manufacturing, **The Colson Corp.**, Elyria, O.

**E. W. Torian**, elected vice president, **Southern Pacific Lines**, Texas and Louisiana; **B. F. Biaggini**, elected vice president, **Southern Pacific Co.**, San Francisco; **B. M. Stephens**, elected ass't to executive vice president, **Southern Pacific Lines**, Texas and Louisiana.

**John K. Deasy**, named assistant vice president, purchasing and traffic, **Weirton Steel Co.**, Div. of **National Steel Corp.**, Weirton, W. Va.

**James M. Dill, Jr.**, named ass't to vice president, sales, **Russell, Burdsall & Ward Bolt and Nut Co.**, Port Chester, N. Y.; **Ward K. Jones**, named ass't office sales manager.

**Frank De Matteo**, named controller and chief accountant, **Shallway Corp.**, Connellsville, Pa.

**E. J. Carlson, Jr.**, elected vice president, sales, **Indiana Forge & Machine Co.**, East Chicago, Ind.; **Vernon H. Lorenzen**, named personnel and production manager; **M. W. Finton**, named estimator; **Len A. Bernier**, named Detroit district representative.

**Peter R. Rentschler**, elected secretary and director, **The Hamilton Foundry & Machine Co.** and elected secretary and director, **The Decatur Casting Co.**, Decatur, Ind.

**John C. Simons, Jr.**, named director, Applied Physics Dept., Research Div., **National Research Corp.**

**C. A. Pafenbach**, elected vice president, sales, **Lavallee & Ide**, Chicopee, Mass.

**R. Louis Dewall**, named ass't comptroller, Accounting Dept., National Tube Div., **U. S. Steel Corp.**, Pittsburgh; **T. E. Hauser**, appointed manager, works accounting.

**Roland F. Miller**, named general staff supervisor, education and development, National Tube Div., **U. S. Steel Corp.**, Pittsburgh, Pa.

**W. H. Machin**, named manager, Forging and Screw Machine Div., **Scovill Manufacturing Co.**, Waterbury, Conn.; **N. J. Schaffer**, named factory superintendent, Forging and Screw Machine Div.

## PERSONNEL



**HARRY W. BUCHANAN, III**, named sales manager, chemicals, metals, and plating products, **Metal & Thermit Corp.**, New York.



**EMORY W. BELL**, named project engineer, Rolling Mill Div., **E. W. Bliss Co.**, Salem, O.

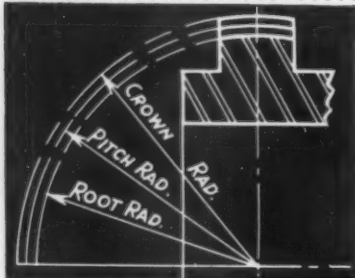


**GERALD L. AMRHEIN**, named industrial engineer, Trent Tube Co., East Troy, Wis.

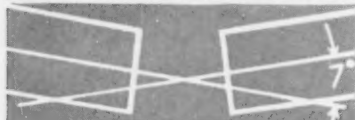


**FRANCIS J. SCHILLER**, named plant engineer, Trent Tube Co., East Troy, Wis.

**PERFECT SPHERICAL TOOTH  
FORMATION PERMITS  
GREATER.....**



**ANGULAR OR.....**



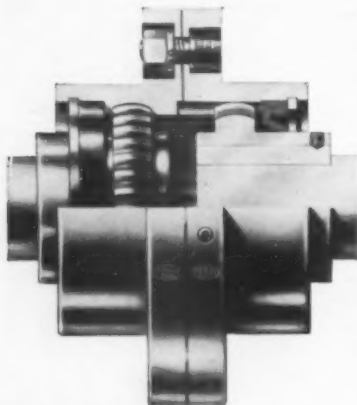
**.....LINEAR MISALIGNMENT**



The Philadelphia SPHEREFLEX COUPLING features a Spherical cut tooth which allows a ball and socket action between mating teeth up to 14° angular misalignment—and due to this angular capacity, a much greater amount of parallel misalignment is possible, which varies directly as the pitch diameter of the gears. All this is accomplished by gearing having a minimum back-lash.

By using Spheriflex Couplings, you can eliminate excessive bearing loads and cyclical bending stresses, which are caused by misalignment between shafts.

Send for Catalog C-560, and be convinced.



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INDUSTRIAL GEARS & SPEED REDUCERS  
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FLUID AGITATORS • FLEXIBLE COUPLINGS

Virginia Gear & Machine Corp. • Lynchburg, Va.

**PERSONNEL**

Calbraith P. Champlin, Jr., named ass't plant manager, Strong Steel Foundry Co., Buffalo, N. Y.; Gerald T. McKee, named sales manager.

George W. Mousel, appointed ass't manager, Sales Dept., Perkin Engineering Corp., El Segunda, Calif.

David R. Prince, named district sales manager, Cincinnati-Dayton Territory, Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Cincinnati; G. L. Leupold, named ass't general sales manager, Fulton Sylphon Div., Knoxville, Tenn.

Henry A. Jacker, named manager, foreign operations, Roots-Connersville Blower, Div. of Dresser Industries, Inc., Connersville, Ind.

A. C. Sanger, charge of operations, Valentine Fire Brick Co., Div. of A. P. Green Fire Brick Co., Woodbridge, N. J.; W. K. Stevens, charge of sales.

John C. Madden, appointed division tubular manager, Export Div., The National Supply Co., New York.

Karl J. Doll, named manager, manufacturing services, Apparatus Service Shops Dept., General Electric Co., N. Y.; Garrett J. Delehanty, appointed manager, Pittsburgh service shop; Allen W. Warren, appointed manager, Youngstown, O., service shop.

Robert L. Stockus, named manager, rolling mill sales, Farrel-Birmingham Co., Inc., Ansonia, Conn.

Following appointments are within the Fabricating Div. of Aluminum Co. of America. T. F. McCormick, named ass't chief metallurgist, Pittsburgh; W. E. King, named chief development metallurgist; K. B. Baker, appointed chief control metallurgist, Pittsburgh; A. M. Miller, named ass't chief metallurgist, Edgewater, N. J.



GLEN R. LARSON, appointed sales engineer, Hydraquip Corp., representative of Valvair Corp., Akron, Ohio.



THOMAS J. KELLY, named ass't manager, Sheet and Strip Sales Div., Republic Steel Corp.

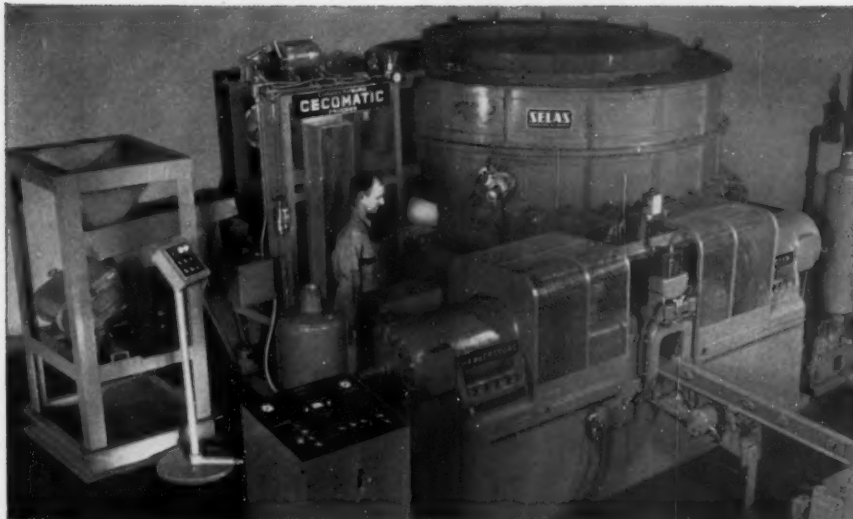


ROBERT A. REESE, named manager, Syracuse, N. Y. district sales, Standard Pressed Steel Co., Jenkintown, Pa.



CLYDE W. TRUXELL, appointed general manager, Detroit Diesel Engine Div., General Motors Corp.





**COMPLETE AUTOMATION** is achieved by integrating Selas Gradiation® Heating into Chambersburg Engineering Company's new, Cecomatic forging process. Brass slugs, up to 1½" diameter x 3¼" long, are heated to 1500°F and delivered automatically to the Impacter at production rates which can be varied from 20 to 40 forgings per minute.



**STEEL BILLETS**, up to 7" square, are heated in this Selas Gradiation furnace at Lansdowne Steel and Iron Company. Fast heating to 1850°F . . . at rates of 2 to 5 minutes per inch of thickness . . . virtually eliminates scale, thereby reducing billet weight 10%. Fast heated billets are forged at temperatures 300°F below conventional methods.

## IMPROVED FORGEABILITY plus savings in labor, time, floor space . . . with **SELAS HEAT PROCESSING**

Improved forgeability, directly attributable to **FAST** heating, reduces power requirements at the usual forging temperatures, or, for given power applied, permits an increase in the amount of flow or deformation. More importantly, this increased capacity for hot work can be used to advantage to permit working metals at lower temperatures, with no increase in applied work.

Whether your forging requirements call for fully automatic or manual handling operations, you always get these benefits from Selas Gradiation heating: rapid start-up . . . low cost per work-piece heated . . . virtual

elimination of scale . . . precise controllability . . . **FAST** heating which helps pace production . . . compact equipment which reduces floor space requirements.

In heat treating, brazing, forging, strip-heating and other continuous operations involving both ferrous and nonferrous metals, Selas engineers can design Gradiation heating to help speed production, improve product quality, reduce costs.

*Our engineers will be glad to discuss how Selas Gradiation methods can be tailored to your heating needs. Address Dept. 17.*

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CORPORATION OF AMERICA  
DRESHER, PENNSYLVANIA

*Heat and Fluid Processing Engineers*  
DEVELOPMENT • DESIGN • CONSTRUCTION



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**SHENANGO**  
**CENTRIFUGAL**  
**CASTINGS**  
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**PERSONNEL**

**James R. Eagles**, named assistant to division manager, **Bryant Electric Co.**, subsidiary of Westinghouse Electric Corp.

**B. M. Brown**, appointed manager, Baltimore, Md., divisions, **Westinghouse Electric Corp.**, Pittsburgh; **Dr. S. W. Herwald**, named manager, Air Arm Plant.

**Hooker Stoughton**, named manager, aircraft fastener section, Closure Div., **Scovill Manufacturing Co.**, Waterbury, Conn.

**C. F. Boyer**, appointed special ass't to manager, sales, Alloy Tube Div., **The Carpenter Steel Co.**, Union, N. J.

**C. E. Douglas**, named controller, White Diesel Engine Div., **White Motor Co.**, Springfield, O.

**Dr. Leonard Scribner**, named ass't manager, Metals and Chemicals Div., **Fansteel Metallurgical Corp.**, N. Chicago, Ill.

**Russell L. Sylvester**, named chief engineer, central valve research and development, **Rockwell Manufacturing Co.**, Pittsburgh.

**Glenn B. Miller**, named traffic manager, **Crucible Steel Co. of America**, Pittsburgh; **Daniel G. Donovan**, named ass't traffic manager.

**Dr. A. Eugene Schubert**, named manager, Chemical Development Dept., **General Electric Co.**, Pittsfield, Mass.

**OBITUARIES**

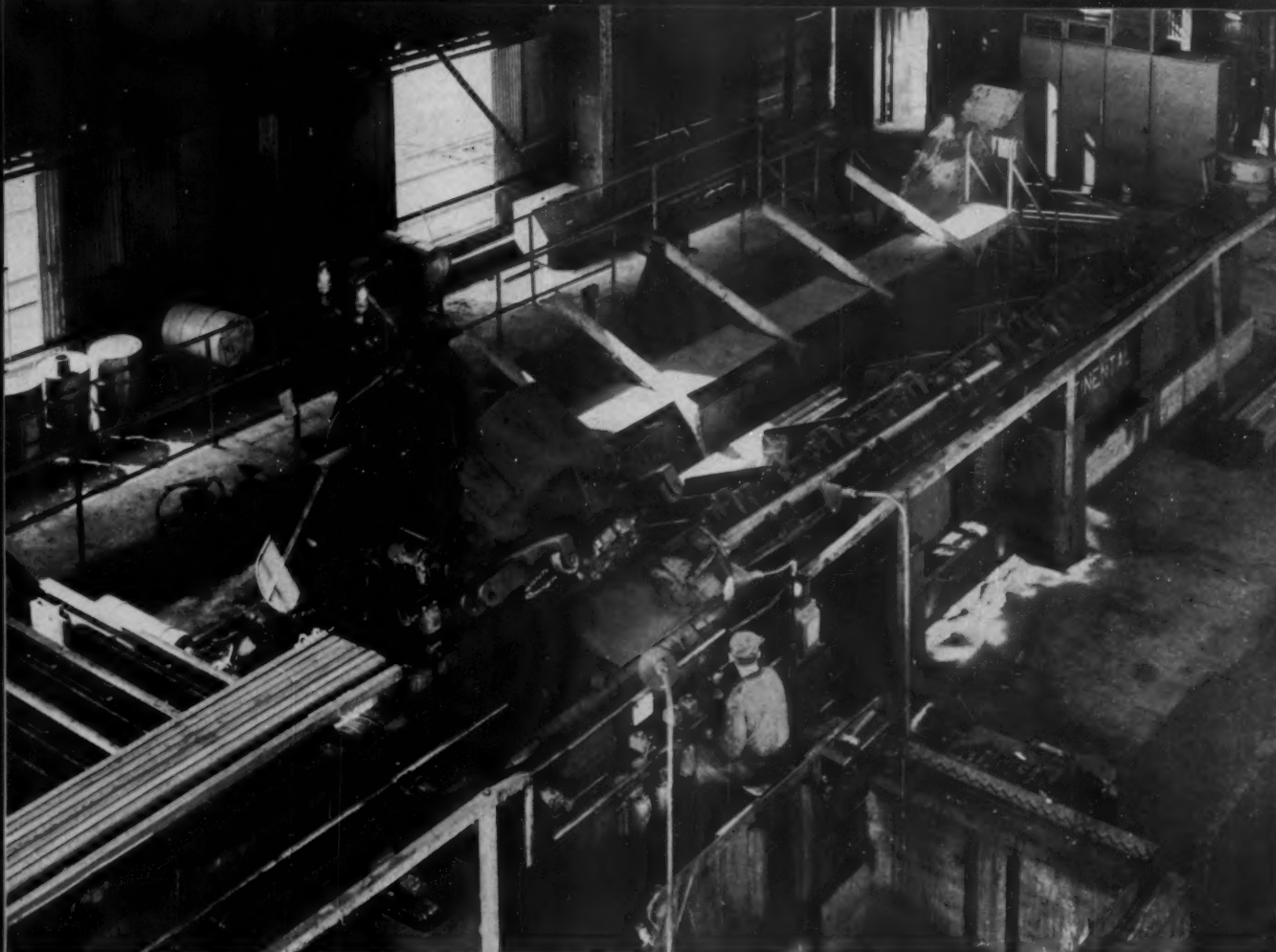
**Philip Arnold**, 73, retired vice president, **The Garlock Packing Co.**, Palmyra, N. Y.

**William B. Peirce**, 78, past president, **American Society of Tool Engineers**, Pittsburgh; and retired vice president, research and development, **Flannery Bolt Co.**, Bridgeville, Pa.

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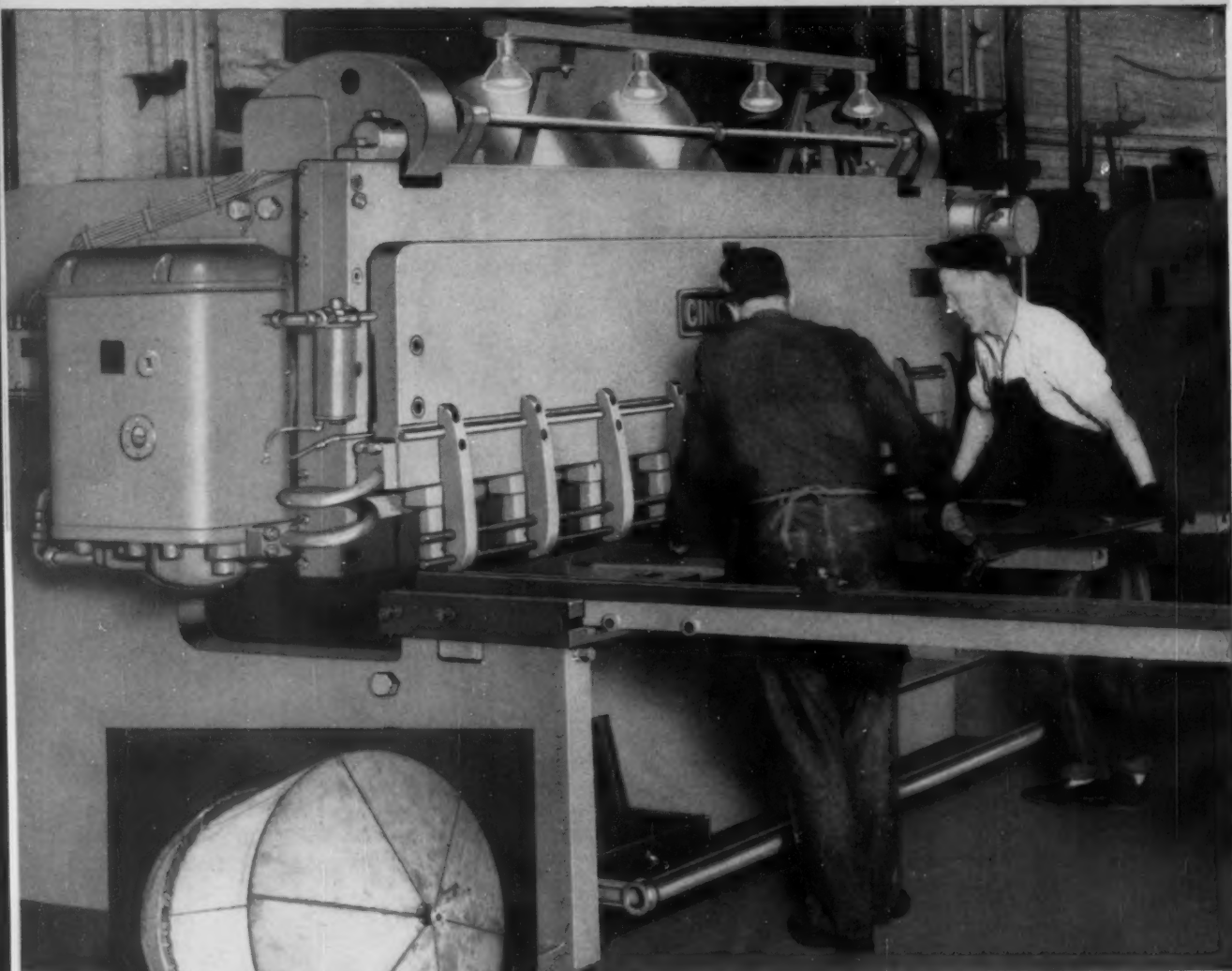
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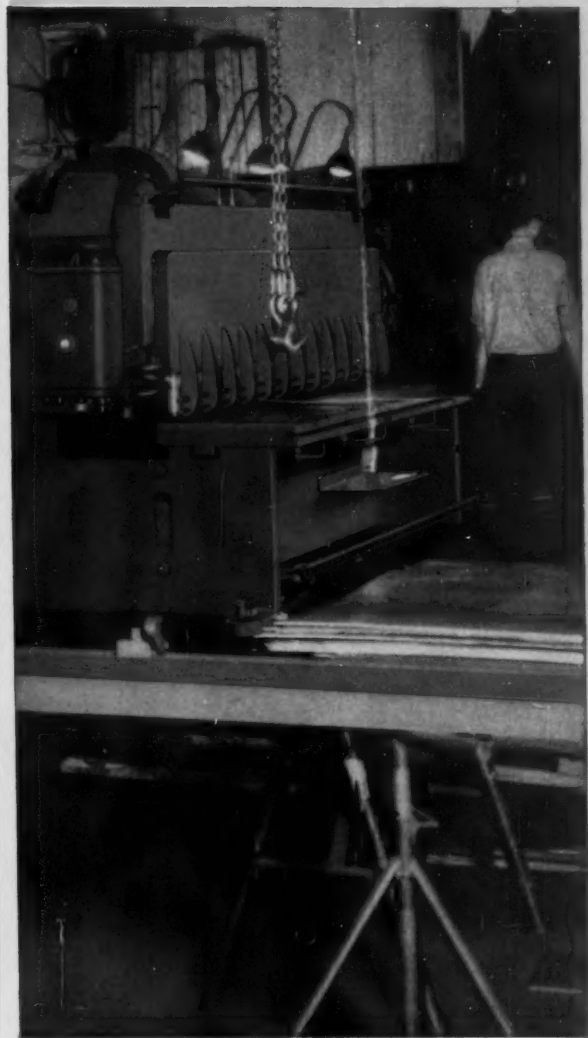


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Key to new processes—

# Ultrasonics: Sound Breaks Metalworking Barriers

♦ With a clutch of industrial tools and techniques to its credit, ultrasonics is now ready to probe an unlimited future . . . In metalworking alone, that future is likely to open new process horizons in heat treating, joining, electroplating, casting, and a host of fringe developments.

♦ Implementation of such processes hinges on the design of full-scale equipment that can be put to work industrially . . . No cinch, it's a job that can't be accomplished overnight . . . But the potential—marketwise and profitwise—is something the metalworking industry can't afford to overlook.

♦ STILL relatively small, the ultrasonic equipment industry is enjoying steady—though not spectacular — growth. In most respects, its present status must be considered normal for a new industry. Its immediate goal is the mass acceptance of the products it makes. Achieving that goal is pretty much an up-hill climb.

In the course of the climb, the industry is faced with a number of obstacles. For one, few people really know what current ultrasonic equipment can and cannot do. Even fewer understand the principles that make such equipment operative. Overcoming these obstacles calls for a tremendous educational program.

## Signs are promising

Another problem is deciding how and where to expand equipment applications for the future. This is primarily a job of research. As might be expected, a fair portion of this assignment is being handled unofficially by the users of ultrasonic equipment.

At least two signs are promising. To begin with, the equipment makers are not easily discouraged. Faith in the future of ultrasonics as an industrial tool is their driving force. Fortunately, too, none of the problems faced

By P. M. UNTERWEISER, Metallurgical Editor

by the industry today is downright insurmountable. For the more courageous, this fact provides a mild form of encouragement.

One thing the ultrasonic equipment industry can count on; what it has to sell is unique. It is, in fact, as unique as sound. There are no known substitutes. In a number of important applications, no other form of energy can achieve the same results in precisely the same manner. Almost equally unique is the fact that the industry is not interested in overselling either itself or the performance of its products.

Most commercial ultrasonic equipment is presently designed for those applications which are best known and—at least for now—most successful. These include nondestructive testing, cleaning, and a specialized kind of machining.

These few commercial applications are not the alpha and omega of ultrasonics. They represent a very modest beginning.

A better understanding of ultrasonic principles unfolds a great deal more of the future potential. Here the industrial possibilities become enormous, assuming that satisfactory equipment can be designed to handle them. It is the lure of this potential that continues to attract all kinds of applied and theoretical research.

### How it works

In the metalworking industry alone, this research now covers the application of ultrasonic energy to heat treating, all forms of metal joining, electroplating, metal casting, metallic crystal formation, and a variety of projects that are "restricted" for either commercial or military reasons.

All of these applications, whether real or potential, stem from a controlled use of sonic energy. All sound, audible or inaudible, is a form of energy. This sonic energy is trans-



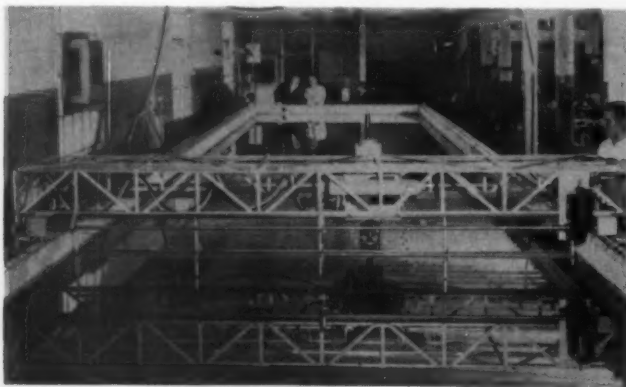
Portable ultrasonic test equipment has the distinct advantage of providing "on the spot" checks. Photo by North American Aviation, Inc.

mitted in the form of vibratory waves. The waves, in turn, are made up of individual particles. Transmission of sonic energy can be accomplished to some extent in liquid, gaseous, or solid media.

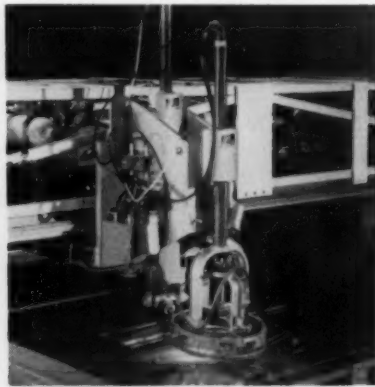
The sound we are able to hear is almost wholly restricted to the "sonic" frequency range. The lower limit of this range is about 16 cycles per second. It is lower than the lowest note on the piano and just a little higher than the buzz produced by bats.

The high limit of audible sound is about 16,000 cycles per second. This is far higher than the highest note on the piano and is within the normal range of sounds made by the common grasshopper.

The ultrasonic range begins at a frequency level slightly above that of the sonic or audible range. Its lower limit is a little over 16,000



This large ultrasonic testing tank is operated entirely by remote control at a single console. The setup is being used for the non-destructive internal inspection of rolled aluminum. One man operates the precision scanning system, the heart of which is contained in the transducer. Photo by Curtiss-Wright Corp.





cps, and it continues upward to at least 15 million cps. Somewhere within this broad range lie those frequencies best suited for the transmission of wave energy for ultrasonic applications.

Obviously, this energy must be generated somehow. In the audible range, the generating source may take the form of the human voice or a musical instrument. But in the inaudible range—the range of “ultrasound”—the man-made generating source is usually electrical current.

Since electrical current and sound are not synonymous, a changeover from one to the other is essential. Any gadget capable of performing this switch is known—in the parlance of electrical engineering—as a “transducer.”

There are three major types of transducers, each classified according to the material used to accomplish the transduction or energy transformation. The commonest are piezo-electric crystals. Quartz, Rochelle salts, and ammonium dihydrogen phosphate are included in this group. Polycrystalline barium titanate is another crystalline form of transducer that falls into a slightly different classification.

### Power factor counts

Finally, there are the magnetostrictive transducers made of alloys of nickel and iron, iron and cobalt, or similar combinations. Each of these transducing materials possesses special properties. Any one could be preferable, depending upon the specific application and the optimum frequency at which it is intended to operate.

Choice of a suitable transducer is only one aspect of the overall problem. It takes care of the *rate* of energy propagation. There still remains the *amount* of energy propagated.

It is this matter of the amount of energy—the power factor—that generally tends to place the major restriction on ultrasonic applications. It is usually the factor that divides the practical from the impractical, the present from the future.

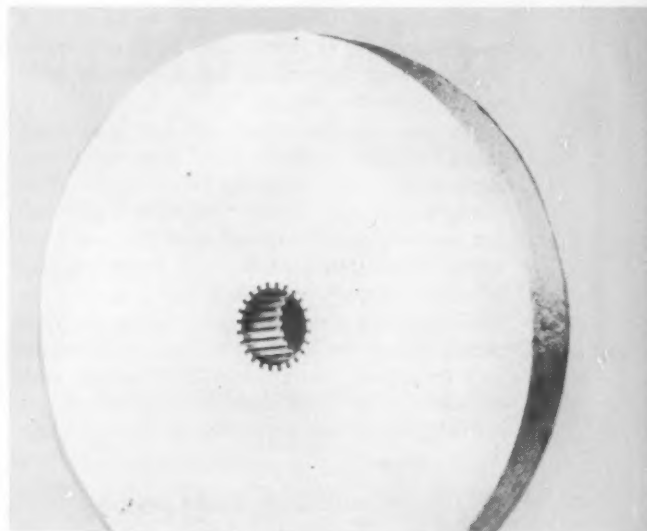
Ultrasonic cleaning is both practical and fairly commonplace. Contrary to widespread belief, it does not inherently require special cleaning baths. Many run-of-mine cleaning solutions meet all requirements and perform with a high degree of efficiency.

Experience indicates that only a percentage of all metal cleaning operations require, and can justify the use of, ultrasonic techniques. So that the problem is as much a matter of knowing *when* to use ultrasonics as it is a matter of *how* to use it.

Cleaning the inside surfaces of hollow parts or recesses that are hard to get at are justifiable applications. Depending upon part geom-

etry, there are instances where no other type of cleaning will produce equally satisfactory results.

Within recent years, piezo-electric transducers have been developed which can operate in both conductive and non-conductive solvents. These include ordinary water and water solutions of alkaline and detergent cleaners as well as soaps and petroleum products. As one expert points out, there are at present only two general requirements for a cleaning liquid to be used along with ultrasonic energy. It must provide good contact with the surface to be cleaned, and it must have an initial effect upon the dirt to be removed from that surface.



This extrusion die is typical of the complex internal machining now handled ultrasonically. Photo by Raytheon Mfg. Co.

Unlike their predecessors, the latest transducers are not restricted to use in small tanks. They are designed specifically to work in large-scale, commercial-type installations.

Along with cleaning applications, the use of ultrasonics in nondestructive testing is fairly well known. In its infancy, ultrasonic testing was a fascinating, though often exasperating, jumble. Test probes were primitive and frequently unpredictable. Interpretation of results depended then—as now—upon the proper translation of wave patterns viewed optically on the screen of a cathode ray oscilloscope.

But because the early instrumentation was erratic in its performance, wave patterns produced during the inspection of a single part were not necessarily reproducible. With so many variables, the end results were often hopelessly confusing.

During this same period, the interpretation of wave patterns had not been reduced to an absolute science. As a result, anyone who was sure of his interpretation could never be equally sure that his interpretation was right. Obviously this primitive system of guesses and counter-guesses was a poor substitute for an inspection standard.

Recent equipment improvement and pattern interpretation standardization have done away with both the wobbly instrumentation and the haphazard readings they produced. The modern ultrasonic testers are basic inspection tools. The results they provide are reproducible and capable of being standardized. Used properly, these testers are entirely dependable.

A third generally accepted, commercial-type application of ultrasonics has to do with a specialized type of machining. In its own right, it ranks with the more amazing, modern technological developments.

Several manufacturers are now producing this specialized equipment for commercial use. Essentially, the equipment takes its cue from the principle that power "transferred through a metal punch with a soft tool tip to a hard abrasive can make cavities in materials that are harder than the tool tip."

Normally, the power is alternating electrical current converted to mechanical vibration at high frequency. The cutting tool is usually fastened to the tip of a vibrating tool cone which moves perpendicularly to the tool face.

### Machines with sonic energy

According to Raytheon's application engineer, P. J. Duran, their "impact grinder" provides manufacturing processes with a "latitude undreamed of five years ago." In this short time, thanks to the impact grinder, "such things as cutting 0.004-in. slots  $\frac{5}{8}$  in. long in stainless steel in 10 minutes have become standard procedure.

"Sinking a complete blanking die or intricate shape in hardened tool steel to a tolerance of 0.0002 in., simultaneously cutting a dozen or more holes accurately spaced in ceramic spacers in a matter of seconds, dicing several hundred transistor crystals at one time in less than a minute, cutting several hundred jewel bearings simultaneously in a matter of minutes, all these are possible using soft steel or even copper as the cutting tool."

However promising, all of these applications provide no more than a fractional glimpse of the known and practical uses of ultrasonic energy. The developmental aspects—many of which are likely to be realized in the near future—are even more impressive. If successful,

some of these potential applications could wholly revolutionize scores of standard processes in the metalworking industry.

Heat treating supplies an important example. Within the past year, H. V. Fairbanks and F. J. Dewez, Jr., reported that the application of ultrasonic energy to steel at the austenitizing temperature resulted in a refinement of grain structure and an appreciable increase in hardness (THE IRON AGE, Dec. 8, 1955).

They concluded that ultrasonics provides at least two significant effects. It increases the rate of atomic diffusion, and it also plays a part in determining equilibrium grain size.

What strikes home commercially is the fact that these same effects are not limited to the heat treatment of steel. They are applicable to such standard processes as carburizing, nitriding, carbonitriding, and chromizing.

### Seek new developments

If the rate of atomic diffusion can be increased with the addition of ultrasonic energy, then each of these processes can be accelerated to an extent never before achieved. The net result: important savings in furnace time, fuel and power costs, and other overhead charges.

The implementation of such processes depends almost entirely upon the development of full-scale equipment that can be applied industrially. This isn't likely to be accomplished over night. But the future of ultrasonics hinges upon just such developments.

Similar examples of process acceleration and quality improvement are provided for welding and brazing, soldering, electroplating, casting, and other crucial metalworking processes. In each case, the initial test work has been completed and the potential has been disclosed. Only the successful development of commercial installations remains.

This is a tremendous assignment for any industry—large or small. But it is a challenge the ultrasonic equipment makers are not likely to disregard.

### ACKNOWLEDGMENT

The editors want to thank the following companies for their cooperation in helping to make this feature possible: Bell Telephone Laboratories, Inc., Branson Instruments, Inc., Curtiss-Wright Corp., North American Aviation, Inc., Raytheon Mfg. Co., and The Sheffield Corp.

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♦ **MACHINING** of long parts often presents some difficult problems. But it can be done readily by using a multiple-stock feedout arrangement on a conventional multiple-spindle screw machine. This set is used in conjunction with a pneumatic stock reel.

Stock feeds can be made in as many as three of the six work stations with one such machine, made by Greenlee Bros. & Co., Rockford, Ill. This arrangement permits parts to be machined close to the spindle, as they're fed out in successive work stages. Feedout can occur either during spindle-index cycle or the machining cycle.

Here's how one typical 19 in. shaft is machined with the arrangements.

A standard 1½ in. bar capacity, six-spindle screw machine is used. The shaft is machined from ¾ in. round B 1113 stock, at 215 sfpm on the outside diameter. This surface speed calls for an 1100 rpm spindle speed. The main tool-slide stroke is set at 1 13/16 in. length, with 0.0046 in. feed on end-working tools.

Seven operations are completed in 24 seconds cycle time—a gross production rate of 150 pieces per hour.

The sequence is simple. When the machine starts into the feed cycle, the collet in the first position opens and is held open until stock feeds out against a special receding stop. Two such receding stops are used in this setup, one in the first, another in the fifth position. The collet opening in both positions occurs at the same time.

The special stops have live centers to prevent marring of finished ends. A small air cylinder on the gear box controls receding actions of stops in both positions.

Following the workpiece around, the collet closes when stock, fed out to a length of 7¼ in., contacts the receding stop in the first spindle index position. The stop then moves away from the end of the bar, allowing it to rotate freely and to index to second position. Here, the bar end is spot drilled to provide center for a 27/64 in. tap drill, as well as chamfer for a ½-13 tapping operation.

#### **Drill, taper operations**

The spindle then indexes to third position. Here a hole is drilled to depth. Also, 6½ in. of bar length is turned to a long taper in this position. A special form-turning attachment and an accelerated feed mechanism are used for this long turn.

In fourth position, the ½-13 N.C. thread is tapped, using a standard threading attachment. In the fifth position, the collet opens during feed cycle, allowing the shaft to feed out to its full 19 in. length.

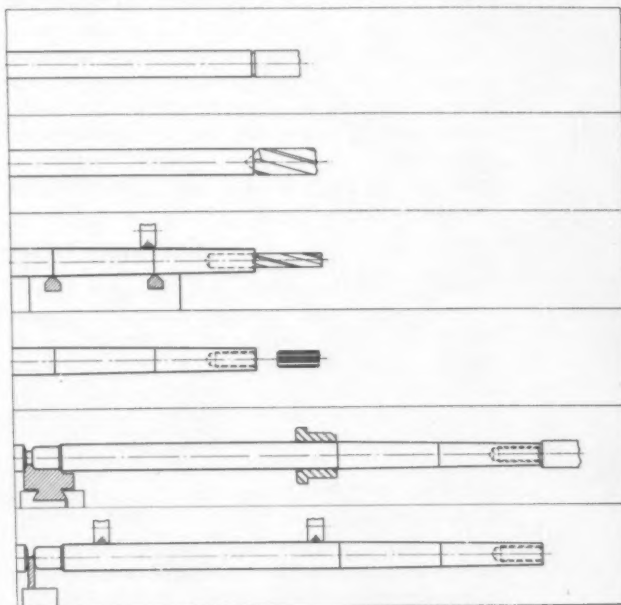
When length requirements are satisfied, a standard dovetail form tool enters the work

On long parts—

# **Multi-Stock Feedout Simplifies Machining**

and forms the rear end of the shaft. In sixth position, the workpiece is cut off, while a two-roll support steadies the front end of the shaft. This drops into an ejecting mechanism, controlled by mechanical linkage to rear cam shaft.

This mechanism ejects the shaft into a work discharge chute as the machine goes into the next index cycle.



**TOOLING** and operations performed on multiple-spindle screw machine are shown in this line drawing. Read order of operations from top down.

## Better Brazing Turns on Rotary Tables

♦ Versatility of silver brazing joining techniques is widely recognized . . . Proper fixturing adapts brazing to a broad variety of high production requirements . . . Rotary tables are one such extremely useful device.

♦ HOW DO YOU make an inherently fast, economical and efficient joining method like silver brazing even faster, more economical, more efficient? One obvious answer, where relatively high production brazing's required, is through better fixturing, with rotary indexing tables and the like.

Such semiautomatic brazing setups are common in many production shops today. Three typical examples, all silver brazing setups, serve to illustrate the versatility possible. Items joined differ widely. But in each case, service requirements for the parts demand quality braze at high production rates.

### Use rotary tables

Rotary indexing tables are the common key.

First setup is at Tecumseh Products, Tecumseh, Mich. This firm, one of the country's largest producers of refrigeration systems, turns out a sizable portion of the refrigeration compressors for room air conditioners and for different makes of refrigerators and freezers. Their biggest individual class of system is based on a 1/8 or 1/6 hp pancake compressor for home refrigerators.

Just about every tubing joint in these systems and a number of additional sub-assembly joints are made with low-temperature brazing. Joints of copper to copper, copper to steel and copper to cast iron are made with ease. A 45 pct silver, 15 pct copper, 16 pct zinc, 24 pct cadmium alloy, Handy & Harman's Easy-Flo 45, is used.

♦ There are many ingenious setups . . . Here's how three plants solved their problems of getting higher production while maintaining brazing quality and slashing costs . . . Number of different parts are joined.

To step up production of large volume, standard components like its muffler and header sub-assembly, Tecumseh put in an automatic brazing station. This permits brazing several joints simultaneously on the assembly, which consists of two cast iron components to which are brazed shaped lengths of copper-on-steel tubing.

Generally speaking, cast iron is no cinch to braze. Graphite content in certain cast irons inhibits the wetting action of the brazing alloy, and makes a good metal-to-metal bond difficult.

Tecumseh gets around this by degraphetizing castings with the Kolene process. This takes enough graphite from the casting subsurface to permit good adhesion of the alloy, so brazing can proceed normally as with any other metal.

Four men feed and discharge the automatic brazing operation. One puts the rings of brazing alloy over the ends of the copper tubing. Second man assembles tubes and castings on a jig and passes them to the third man, who fluxes the joints and loads and unloads the jigs on the brazing table.

Fixtures mount on angle bars fixed on the table. An air-actuated ratchet revolves the table, which indexes every 18 seconds, moving two assemblies into the burners and two out of the heating area with each indexing travel. Each burner station in the line consists of three air-gas burners—one multiport flame retention burner which heats from above and two ceramic-lined superheat burners which burn from below.

Each assembly makes six heating stops be-





**FOUR-MAN SETUP CREW** serves this automatic brazing station at Tecumseh Products. Tubes and castings are jigged, fluxed, loaded and unloaded from brazing table at 400 per hour rate.

fore passing through the semi-circle of burners. This leaves sufficient time under heat with lower flame temperatures possible.

Production with this automatic setup is 350 assemblies an hour with 4 men required, as against a total of 400 assemblies and an 8 man crew with earlier hand torch methods.

Brazed assemblies are removed from the table and quenched to cool the parts and remove flux. A quick quench from brazing temperature is best since the flux tends to flake away from the metal under rapid temperature change. If the flux is allowed to cool it takes longer to dissolve and may need hand brushing.

#### **Removes quenched assemblies**

The fourth man takes quenched assemblies from the bath, removes them from the fixtures and reloads the upper part of the fixtures with the muffler casting for another cycle.

Another automatic setup, this one at Allis-Chalmers Manufacturing Co., Terre Haute, Ind., trims 50 pct off the production time formerly required to braze jet blades to engine shroud rings. Defect rate now is reported less than 1 pct; joint strength, several times the required minimum.

This involves silver-brazing inner ends of 28 nickel steel blades fitted into perforations in an inner brass shroud ring of the semi-circular assembly. This makes a single, uniformly filleted butt-and-pierced joint.



**INDUCTION BRAZING** machine shown makes 28 blade joints in 10-minute brazing cycle. Circular fixture rotates slowly to move blades between stationary heating coil.

In assembly, two outer aluminum carrier rings are placed in a fixture composed of two half circles. Blades are inserted in carrier ring slots and an operator slips preformed clips of Easy-Flo silver brazing alloy on inner ends of the blades. Then brass shroud rings are fitted to inner ends of the blades.

After fluxing of the joints, the completed assembly and fixture are clamped into a circular fixture for brazing on an Allis-Chalmers Type E1-20B high frequency, 20 kva induction brazing unit. Brazing cycle then proceeds automatically, the rotary fixture remaining stationary for about 45 seconds on startup while induction coils bring parts up to about 1170°F. As each joint moves through the heating area, the blade end and the brass shroud ring are joined.

The 28 joints take about 10 minutes in all to complete.

Third setup, at Buick Motor Div.'s Flint, Mich., V-8 engine plant, joins a U-shaped length of steel tubing to an oil pump filter cover. Major component of this arrangement is a simple nine-station indexing dial. Two flame retention type gas burners located outside the dial heat the workpieces as the dial indexes.

Loading is done by an operator at an adjoining bench. After brazing, subsequent indexing brings the assembly under a stream of soluble oil for cooling and washing away of spent flux.

Indexing occurs each 12 seconds, for a total of 300 pieces per hour brazed.

# Interchange Induction Coils To Meet Job Needs

By D. H. OTTO,  
Product Engineer,  
Western Electric Co.,  
Kearny, N. J.

♦ Adaptability characterizes induction heating . . . You can braze one day, temper the next—with the same basic equipment if required . . . Key to flexibility is the induction workcoil, and its proper selection and design.

♦ Tailored correctly to specific job needs, workcoils can boost heating efficiency, set high standards in quality and uniformity . . . In interchangeable sets, they provide a means of getting more for your induction investment.

♦ FLEXIBILITY keynotes induction heating. Interchangeable high-frequency workcoils energized by basically similar equipment help to achieve this. The ability to match high-frequency coils to specific job requirements often makes the difference between average and highly efficient setups.

Appeal of induction heating rests mainly on its nonspecialized nature, plus such acknowledged advantages as reliability, cleanliness, selectivity and uniformity of heating. By substituting one workcoil for another, and matching frequency and current to the workpiece, the same basic apparatus can successively handle dozens of shop heating jobs.

Metalworkers can use this versatility in several ways. On short production runs, a piece of induction equipment can function in one capacity on Thursday, another on Friday. Set-up and tooling costs frequently are not at all expensive in low volume production.

Such costs average higher on large production runs. But there the job more likely can absorb expensive tooling. In mass production, too, setups tailored specifically to the job enable time and labor savings through more efficient use of heat.

Multiple uses of induction heating all center around efficient workcoil design. Factors considered include desired production rate, length of heating cycles, material, design requirements and top limit on manufacturing costs. Choice of generator power-rating and final workcoil design represents all these.

Lacking good design, flexibility and most other advantages may vanish.

So how do you select workcoils? Which does the best job where? You have three choices, (1) turn over the entire job to the equipment supplier, (2) hire or train a specialist to figure out exactly what's needed, or (3) develop workcoil design empirically, by cut and try through experience.

## Match workcoil with job

First choice always is appropriate. Prospective users of induction heating can send samples directly to the generator supplier for an opinion. Obviously, such a firm possesses a wealth of experience in the field.

Second choice seems more likely to fit larger metalworkers. There volume of work can justify a specialist.

Developing coils by experiment can't be recommended as a general practice. There are simply too many variables involved. But realis-

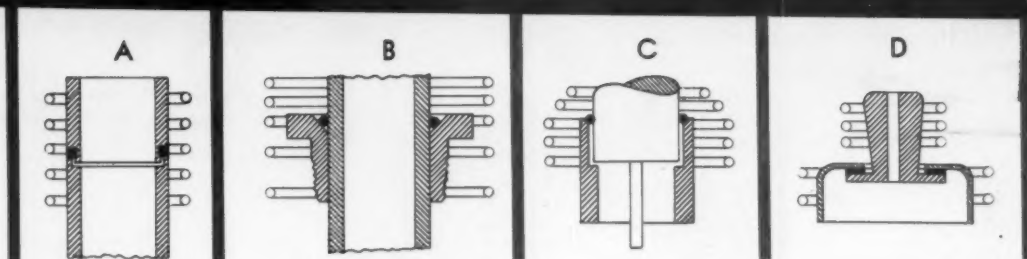


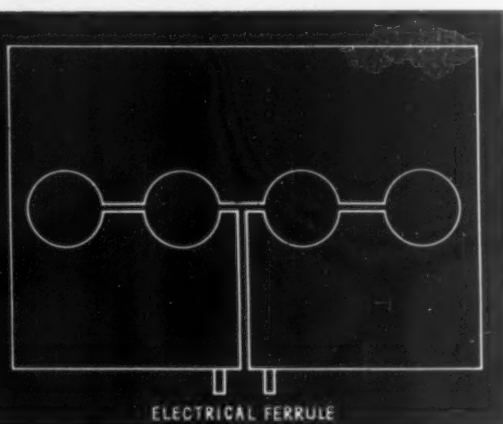
Fig. 2

tically, it's conceded this approach pays off more often than not.

Experience is a major factor here. Similar jobs frequently take similar workcoils. But question of what is similar and what is not can prove a slippery one.

Induction heating converts alternating current (usually 60 cps) to the high frequency range, conventionally 3 to 1000 kc. Three types of equipment commonly achieve this, (1) spark gap converters, (2) motor-generator sets, and (3) vacuum tube oscillators.

Fig. 1



Spark gap converters once held a high place in induction heating. Now they approach obsolescence, due largely to Federal Communication Commission's regulations on radio and television interference. Motor-generator sets enjoy a significant place, particularly in forging and melting applications where large units prove economically sound.

Vacuum tube oscillators make up the bulk of current induction heating installations. Such oscillators range in price from the \$1,000 range for a 1-kw unit to about \$20,000 for 50-kw generators. Oscillator or power tube guarantees vary from 1000 to 1500 working hours, but 5000 to 8000 hours of life are not uncommon. Additional costs, including tooling, depend mainly on the amount of automation desired in the job.

Nominal frequencies of vacuum tube generators generally run between 200-800 kc. Higher frequencies are available for special applications, such as hardening thin sheet, wire and materials of lowest permeability.

Generators up to 5 kw are mostly single phase. Higher output equipment calls for 3-phase power supply.

Power output above 1 or 2 kw most often demands water cooling of oscillator tubes. Tank circuit, including workcoils, also requires water cooling.

Workcoil design basically involves putting the right amount of heat in the right place at the right time. Design of workpiece assumes significance too, particularly in joining operations.

Induction heating time is a function of ampere-turns in the workcoil. Proper concentration of heat depends largely on workcoil spacing. Final temperature varies with the current induced. Generator output, its working frequency and properties of the material being heated help determine current.

As a rule-of-thumb, approximately 300 kw-seconds will heat 1 lb of steel from room temperature to 1400°F. Brass and stainless steel require approximately 600-900 kw-seconds. Copper calls for near 1500 kw-seconds.

It's quite possible to sit down with charts and tables to match exactly the workpiece material with the workcoil and tank circuit. But this isn't generally done. In practice, the layout man relies mostly on experience. Over a time, skill is acquired enabling specification of the most efficient heating coil.

Although experience aids greatly in changing from one job to another, it's not a requisite. Generator suppliers will provide help

Fig. 3

Additional coil spacing at corners controls current induced there, avoids overheating.

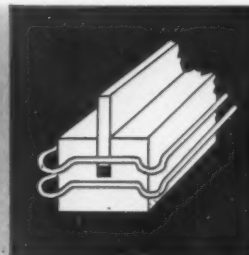


Fig. 4

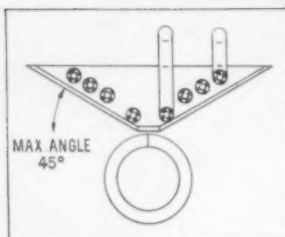
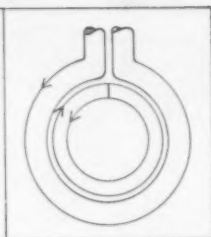


Fig. 5



## Use Induction Heating For

preheating  
 melting  
 brazing  
 soldering  
 welding  
 through-hardening  
 surface annealing  
 tempering  
 stress relieving  
 surface hardening  
 shrink fitting  
 hot forming  
 forging

when experienced men run into trouble.

Copper workcoils prove satisfactory, but sometimes aluminum will do. Copper tubing when used functions in two ways at once: it carries high frequency current through the tubing wall, and water coolant in the core.

In many cases, copper tubing connects directly to the generator with leakproof flare nuts. Most such coils support themselves without frames or studs. Tubing most often used includes  $\frac{1}{8}$ ,  $\frac{3}{16}$  and  $\frac{1}{4}$  in. sizes.

Milled, drilled and slotted conductive plate can be used, particularly in multi-position heating. Fig. 1 shows a simply made coil. Drill any number of holes (within reason) into a copper or aluminum plate, equally spaced along a common centerline. Slit the plate through each hole, then again at right angles to the first. Add a tube for water cooling.

Ready-made coils provide easy interchangeability. Master coil comprises a water-cooled, slotted ring of large diameter. A variety of successively smaller slotted rings fit into the larger ring, adapting the coil to a variety of workpieces.

Coil spacing assumes special importance in joining, though it's strongly significant in other areas of induction heating. Reason involves need for selectively heating joint. Speedy and

directional heating help avoid metallurgical changes in nearby metal, usually undesirable.

In Fig. 2a, note the even spacing of the five-turn workcoil around the workpiece. Simple part design with similar cross section provides some assurance of even heat flow.

Workpiece in Fig. 2b shows a fairly typical joining problem. Coil spacing around the workpiece may appear illogical. One might think coil concentration should be around the heavier mass, providing more current to raise its temperature more rapidly.

Quite to the contrary, heat should concentrate on the inner tube. This because of the flange's shielding effect. Although the flange heats readily, its mass conducts heat more slowly than the thin-walled tube.

Fig. 2c illustrates nearly the reverse situation. Mass of the center plug requires coil concentration there to bring it up to joining temperature. More widely spaced coils around outer tube bring that section to temperature simultaneously.

### Raise temperature evenly

In joining a thin-walled container to a massive nozzle, concentrate coil turns at the heavy part. As shown in Fig. 2d, this helps bring both sides of the joint to temperature at the same time. Keep coils away from the center hole, because of its tendency to overheat.

Passing around corners, or through angles calls for special attention. Fig. 3 illustrates one way of handling the situation. Additional spacing between coil and sharp corners helps avoid overheating at edges.

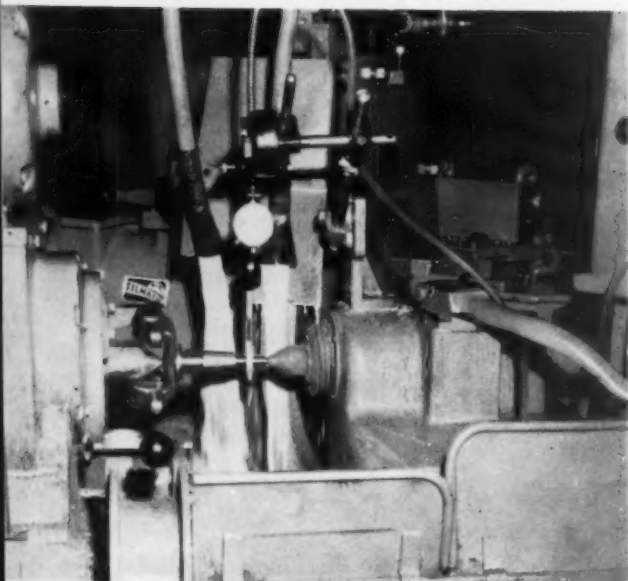
Occasionally, heat concentrations must be focused on certain workpiece sections difficult to reach with normal coils. Setups like that of Fig. 4 help achieve this. The actual coil, including primary and slotted, funnel-like secondary, functions as an auto-transformer. Connection across the funnel bottom provides mechanical strength only.

Processing some workpieces can require high currents. Closely spaced coils may be needed. This can introduce the problem of arcing across the air gap between coils and workpiece. Danger to personnel in this case probably is restricted to a minor radio-frequency burn. But heating efficiency drops immediately.

Employing a radio-frequency transformer setup can help reduce arcing. In Fig. 5, note workcoil surrounds a split metal ring. The finely-sawed slit concentrates a strong field in its vicinity, while cutting odds of arc-over.

Using such an installation, workpiece can come quite close to the ring without loss of heating efficiency. This arrangement successfully handles some special case hardening jobs involving sharp contours, heating of nonferrous metal wires, and hardening of low magnetic permeability steel needles.





**FASTER GRINDING** cuts part cost, due largely to closer tolerances, better finish by lathes.

♦ **TRACER LATHE** equipment more than doubles production of machined forgings at the Lansing, Mich., axle plant of Oldsmobile Div., General Motors Corp. Operators now finish-machine more than 100 steering knuckles hourly. Closer tolerances in turning workpieces also helps reduce grinding time at a later station.

Steering knuckle forgings move to Industrial Products Co. tracer lathes on pallets. A single-point carbide tool turns a thread diameter, two bearing diameters and a tapered radius. Tool traverses area between small and large bearing diameters rapidly, without cutting.

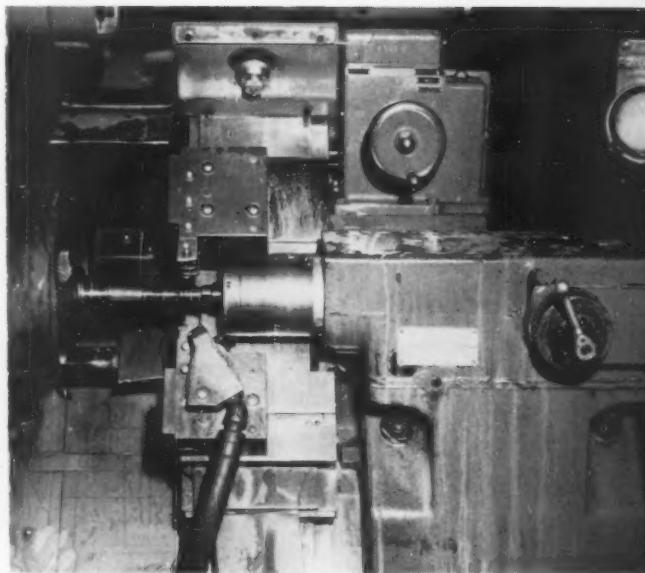
A second tool faces the shoulder at the end of the large bearing diameter.

On completion of lathe work, steering knuckle parts are transferred to Cincinnati grinders. Twin grinding wheels finish parts between centers. Both bearing diameters and adjacent radii are ground. Machined finish produced by tracer equipment makes possible elimination of a shoulder grinding operation, formerly required.

Accuracy of prior tracer lathe work means little metal need be removed in grinding. This contributes to longer wheel life. Current schedule calls for redressing wheels only every 35 to 60 workpieces.

Cut workpiece grinding—

## New Tracer Lathes Double Machining Output



**TRACER LATHE** produces smooth tapered radius, plus several diameters, at double former rate.

# Continuous Furnace Cuts Small Part Hardening Costs

By HERBERT CHASE, Consultant, Forest Hills, N. Y.

♦ Small parts can breed handling troubles that eat up profits . . . One heat treater found this so in case hardening a diverse line of small stampings . . . Continuous carbonitriding helped solve his troubles.

♦ Less costly, more uniform case hardening resulted from installation of a continuous batch-type furnace . . . Operator loads part trays, and furnace does the rest, right through to the final oil quench.

♦ CONVENIENCE and economy spell out reasons for use of a batch-type carbonitriding furnace by International Business Machines Corp. Its Poughkeepsie, N. Y., plant finds carbonitriding helps solve many problems associated with case hardening a multitude of small typewriter parts. Workpieces are stamped and machined from low carbon and alloy steels.

Hardening of many parts earlier called for salt bath treatment. Manual labor associated with processing large numbers of small parts on

wire hangers proved costly. This hand work increased chance of damage to parts.

Switch to a carbonitriding furnace brought a number of benefits.

Greater work volume helps improve the production picture. Continuous heating and quenching cycle of batch lots avoids much manual handling, and insures uniform conditions. There's also an arrangement for quenching without rehandling.

Simplified handling contributes to more satisfied workers. Operators carry out their duties in comfortable surroundings with only momentary exposure to heat. Conveyors ease loading and unloading. Once part trays enter the Dow furnace, they pass through the full hardening process automatically.

Most parts treated comprise fairly thin-sectioned stamped and screw machine products. Materials specified range from low carbon SAE 1010, 1018, 1113 and 1118 steels through SAE 4615 Ni-Mo to SAE 8620 Ni-Cr-Mo alloy steel. Heat resistant containers for part trays are 35 pct nickel, 15 pct chromium alloy steel.

Use of open-bottomed containers encourages vertical flow of furnace atmosphere and quench

oil between and around parts. This helps produce the uniform treatment required. Part tray bottoms are screened for similar reasons.

In general, parts are spread in shallow layers on screen-bottomed trays, then tiered in the containers. If such loading could give rise to distortion beyond that tolerated, parts are placed on racks to minimize warpage.

Natural gas and ammonia make up the carbonitriding gas mix. A propeller in the furnace circulates the atmosphere rapidly to pass it continually through the containers and around parts.

Radiant tubes supply heat required to bring to completion the carbonitriding process.

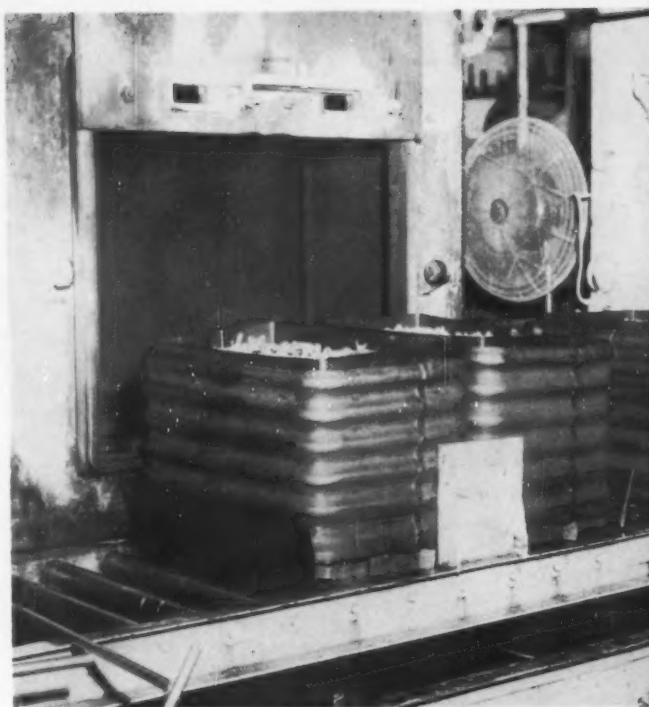
Furnace atmosphere supplied to the vestibule both keeps air from entering the furnace, and avoids oxidation of heated parts about to be quenched.

#### **Hardened in automatic cycle**

Furnace atmosphere supplied to the vestibule provides desired case hardened depth of 0.001 to 0.002 in. Actual depth specified varies with part design and anticipated service conditions.

Furnace charges four containers, two at once. So vestibule door remains open just a few seconds at any one time, two tray-filled containers sit in readiness for a quick shift into the furnace.

On charging, the operator pushes a button to start the entire cycle. Vestibule door closes, and hardening gets under way. Cycle steps include automatic shift of parts from vestibule into furnace, heating for a predetermined interval, return to the vestibule, and quenching—both containers simultaneously. When the second pair of



**CASE HARDENING** of mixed part lots in batch type carbonitriding furnace proceeds automatically.

containers leaves the vestibule, door opens to receive the next charge and to start a new cycle.

Parts enter quench bath at near furnace temperature. In the fortified, rapid-quench oil held at 110° to 130°F temperature, parts encounter an agitated upward flow into containers and around all surfaces. Workpieces remain stationary while quench oil circulates rapidly around them.

#### **Quenched, then pressure-washed**

Operators adjust quench time so parts leave the oil coolant at about 200°F.

An alkaline solution containing a rust inhibitor removes quench oil with a pressure spray. Residual heat in parts dries them before unloading can take place.

Operators manually unload part trays on or near conveyors. After unloading, containers are reloaded in time for furnace recharging.

Shallow, screen-bottomed trays accommodate most parts. When racks are used, they are stacked. Baskets help solve handling some small parts. In case-hardening rods, vertical positioning in baskets or racks throughout the heating and quenching lessens tendency to warp.

Several different types and shapes of parts often are handled in one charge. Operators select workpieces so specified case depth will be attained within the time set for the particular cycle.



**SCREEN-BOTTOMED** part trays facilitate loading small workpieces, insure full gas circulation.

Cuts all grades—

# Steel Hardness Doesn't Bother the Friction Saw

♦ Soft or hard, plain carbon or alloy steels, they're all the same to circular-bladed friction saws . . . Steel mills, fabricators, warehouses and foundries use them for fast, efficient cutting.

♦ At high speeds, heat of friction softens a small area of the workpiece . . . Blade literally wipes this metal out of the cut . . . Edges of blades are smooth or serrated, depending on metal to be cut.

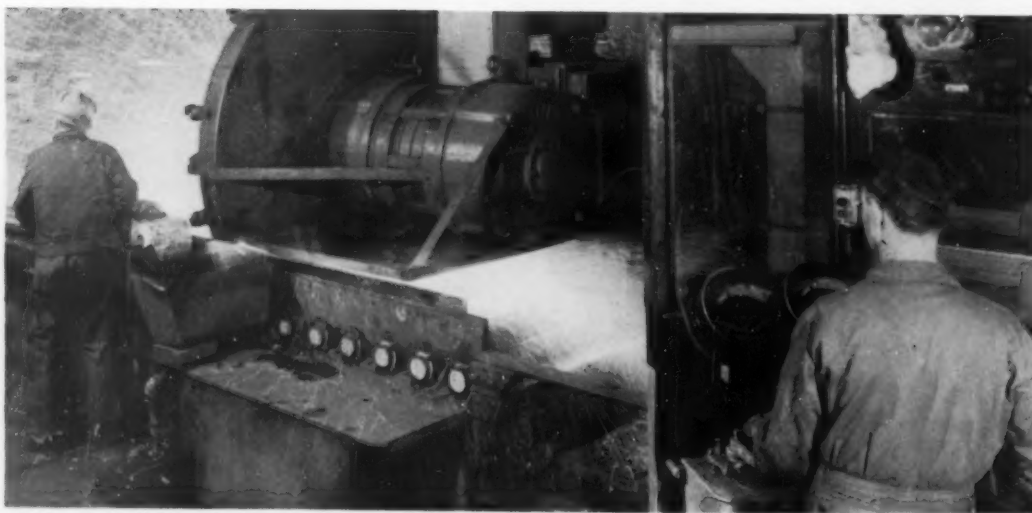
By J. E. HYLER, Consultant, Peoria, Ill.

♦ METALWORKING FIRMS with steel-cutting problems might find it worthwhile to take a close look at friction sawing. One good reason: efficiency of a friction saw is not limited by the hardness of either plain carbon or alloy steels.

Steel fabricators and warehouses use large, circular-bladed friction saws extensively for cutting structural shapes. Steel mills also use friction cutting equipment, generally for severing hot material. And an increasing number of steel foundries employ friction saws for removing gates and risers from castings. Peculiarly enough, however, the technique does not yield satisfactory results when it is applied to cast iron.

Cutting steel with a friction saw consists of progressively heating a small area in the workpiece just ahead of the edge of a rapidly revolving steel blade. Heat is generated by the rubbing blade edge more rapidly than the surrounding metal can dissipate it.

When this area of frictional contact reaches a point somewhat in excess of red heat, workpiece strength is greatly reduced. The sliding



LARGE friction saw cuts structural steel shapes quickly and neatly. Operator controls saw opera-

tion from a protected booth, uses a rheostat hand control to regulate speed of rotary blade.





**INTENSE pyrotechnic display accompanies friction sawing of structural shape in foreground.**

edge of the blade then actually wipes or tears the weakened metal away and constantly exposes a new surface to the frictional action of the blade.

Some variation of blade-edge design is necessary for sawing steels of different carbon content. Steel containing from 0.60 to 1.0 pct carbon, regardless of whether it is hardened or annealed, can be sawed with a blade having a perfectly smooth rim. After a very few cuts, however, the blade rim becomes roughened. This roughness then serves in lieu of teeth.

Steel containing less than 0.60 pct carbon is friction sawed with blades having machined or ground teeth in their rims. One such blade is made with what is termed a "nicked edge." Nicks are similar to those that would be made by striking the rim with a cold chisel at about  $\frac{1}{4}$  in. intervals.

Another style of blade is supplied with a grooved edge. Its teeth resemble gear teeth of  $\frac{1}{4}$  in. pitch. Ends of teeth are cut off concentric with the blade's center bore to about  $\frac{3}{32}$  in. concentric line width. Spacing between teeth is  $\frac{5}{32}$  in.; tooth gullet depth is about  $\frac{3}{32}$  in.

Many customers prefer grooved-edge blades to have alternate teeth swaged or flared outward about  $\frac{1}{64}$  in. on opposite sides of the rim. This gives the blade additional clearance behind the rim to prevent rubbing the sides of the cut.

Grooved-edge tooth form is usually cut so that both front and back faces have approximately a  $30^\circ$  negative angle. Thus, reversing the blade on the arbor will not affect sawing ability. Teeth so shaped are strong, and have a minimum tendency to adhere to metal being removed from the workpiece.

#### **Blade carbon limitation**

Carbon content of saw blades should not be over 0.45 pct. In fact, any alloy which would allow the blade to develop excessive hardness should be avoided. Reason is that the saw blade rim, while cutting, is heated and quenched during each revolution. If carbon content of the blade is too high, quenching the rim as it leaves the work may harden the steel too much.

Success of any friction sawing operation depends on ability of the circular blade to dissipate heat rapidly. Keeping a small area of contact between blade and work means faster, more efficient cutting. And between the time a blade rim section leaves a cut and re-enters it again, it must be cooled below red heat. If it is not cooled sufficiently, metal being removed may weld or braze to the saw rim.

Too much heat buildup in the saw rim will soften blade edge corners, causing them to round off and bulge at the sides. A blade that is deformed in this way will continue to remove metal. But it will require more energy to operate and will produce more burrs on the edges of the cut in the workpiece.

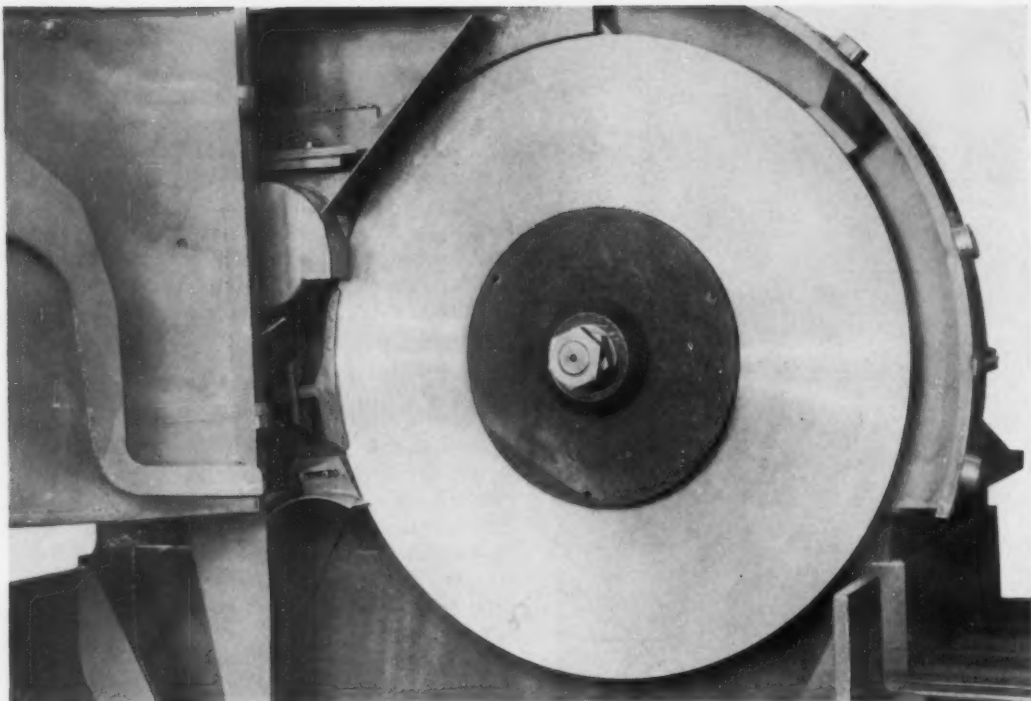
Saw speeds for most efficient operation in cutting cold steel range around 20,000 sfpm. No special benefit has been observed by using speeds above this level.

#### **Keep rim speed constant**

Rim speeds, while cutting, should be maintained at a constant rate. High horsepower motors are needed to provide the necessary drive. However, recommended maximum horsepower limits range from 25 hp for a 24-in. blade (rim thickness at least  $\frac{5}{32}$  in.) to 100 hp for a 48-in. blade. Each foot of blade diameter above two feet is rated as being able to utilize at least 25 additional horsepower. Blade thickness increases  $\frac{1}{16}$  in. with each added foot of diameter.

Larger blades also reduce cutting time. For example, it takes twice as long to cut a 3-in. solid round billet with a 24-in. diam blade as it does with a 48-in. disk.

Heat of friction in the blade rim must be



SPARK deflectors to left of saw direct molten particles down and away from circular blade.

dissipated quickly, usually with the aid of plain water. But ordinary tap water pressure is not usually sufficient to penetrate the air stream created by the whirling blade, even though it may appear that the water actually touches the blade rim.

One steel finishing mill gave this problem special consideration, finally devised two spray blocks wherein four  $\frac{1}{4}$  in. jet holes maintain high pressure sprays on the blade at all times. Firm also installed three sets of wooden baffles inside the blade housing, with baffle edges flush to the side of the blade.

#### **Effectively dissipates heat**

Baffles act to trap water inside the housing so that the saw is virtually submerged in water as it revolves. Effectiveness of heat dissipation is indicated by (1) elimination of a red heat streak on the blade rim, (2) absence of burrs on cut faces of the work, (3) maintenance of sharp corners on blade rim. Life of a saw blade under such conditions is extended greatly.

Large saw blades require special tensioning treatment so that they will rotate in a true plane at high velocity. At the high rim speeds used, centrifugal force can cause the steel disk to stretch more at the rim than it does at the center, resulting in a sidewise flutter.

To prevent this, blade makers create rim tension by hammering both sides of the blade from the center outward to within a few inches of the rim. This stretches the inner area of

the blade within a constricting band of unhammered rim. When standing on edge, a properly tensioned blade will pop away from any slight pressure applied to the blade center.

Heating efficiency of the blade edge and type of material to be cut govern the speed at which a friction saw is fed into the work. Hydraulic devices are sometimes used to maintain a definite pressure between blade and work, regardless of cutting rate.

Feed pressure should be increased gradually until the saw suddenly starts to cut at an obviously faster rate. This indicates proper feed pressure, which should then be maintained at that level. Too slow a cutting rate will allow heat of friction to penetrate too deeply into the faces of the cut. This can destroy certain desirable characteristics in the metal structure.

For example, when stainless steel is friction sawed, undue heat penetration may act to destroy its corrosion-resistant qualities. Excess heat penetration is also an important factor in regard to hardening of cut faces. Some hardening occurs in all friction-sawed materials which have sufficient carbon content. But with equipment that operates properly, this effect is held to a minimum depth.

Generally, attempts to friction saw cast iron are not too satisfactory. Some plants are friction-sawing thin sections of nonferrous materials. Advocates believe there are many other useful applications still to be found.



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## New Technical Literature:

### Catalogs and Bulletins

#### Hydraulic pump-motor

Hydraulic pump-motors offering 2000 psi at 5000 rpm are introduced in a new bulletin. It gives description, photographs and blueprint-type illustrations on a hydraulic pump in a small capacity size that is capable of 200 psi operating pressure when driven by a standard 1800 rpm motor. Likewise, similar coverage is given a hydraulic motor. Motor has a wide range of speed, torque, hp, and pressure—500 to 5000 rpm at essentially constant torque, hp outputs up to 3.4 hp in an extremely small package and its ability to operate over a 400 to 2000 psi pressure range. Specification charts are included. *Gero-tor May Corp.*

For free copy circle No. 1 on postcard, p. 81

#### FOR YOUR COPY

**Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 81.**

#### Crane catalog

A complete line of underhung overhead cranes with a broad range of applications is illustrated and described in this catalog. Types of cranes featured include push type flexible bridge and standard, hand geared, and various modifications of motor-driven types which meet

all standard requirements. Capacities of push type cranes are from ½ to three tons with spans to 30 ft, and hand geared cranes are from ½ ton to five tons in spans to 40 ft. Motor-driven types are available in several different designs with capacities from ½ to 12 tons with spans from 15 to 50 ft. Top and side view line drawings with dimension identification are given for each model followed by complete dimension tables including I-beam, hanger and wheel load data. *Chicago Tramrail Corp.*

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#### Cable conveyor

Information needed to order and install a cable conveyor system is contained in a new 36 page illustrated engineering manual. A new automatic safety controller that provides warning and prevents damage from abnormal load conditions on electrically driven conveyor systems is covered. Manual tells of redesigned standard trolley. All Tipp parts have now been standardized, it says so only trolley wheels need be changed to handle different loads. *Tipp Mfg. Co.*

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#### Thermistors

Full-scale producer of precision thermistors is offering a well-illustrated catalog of its complete line. The 12 page, two color catalog gives dimensional drawings, physical descriptions, and complete electrical specifications for various forms of precision thermistors, including beads, rods, discs, washers, and built-up assemblies. It discusses three electrical characteristics (resistance-temperature, voltage-current, and current-time) which make thermistors highly versatile for many types of control, sensing and measuring applications. Typical applications, illustrated with schematic circuits, provide a convenient review. *Fenwal Electronics, Inc.*

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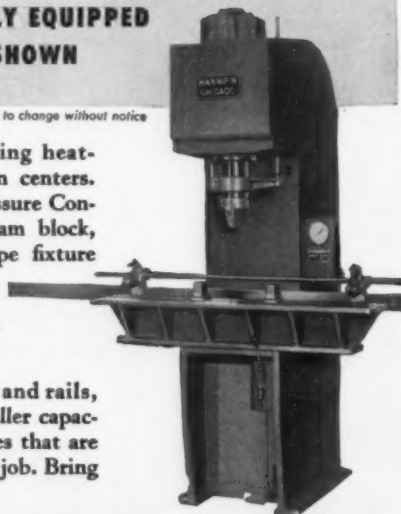
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## Electrodes and powders

Stressing the purity necessary in spectroscopically detecting quantities as small as one ten-millionth of a gram, a 16 page catalog discusses both the initial purity obtained through intensive purification processes during manufacture, and maintenance of purity made possible by special protective packaging. The major portion deals with 37 special grade preformed electrodes. Also described are special grade 12 in. electrodes, and powders, and the regular grade electrodes that can be used where spectroscopic requirements do not demand highest purity materials.

*National Carbon Co.*

For free copy circle No. 5 on postcard, p. 81

## Carbon brick

Color bulletin gives description of a new brick refractory for lining mixer, transfer and bessemer steel ladles, hot metal spouts, cupola wells, etc. Advantages listed are: (1) 50 to 75 pct longer life than fire clay ladle brick, (2) 100 pct size uniformity insuring tight joints, (3) monolithic, self cleaning surface, and (4) low cost.

*Illinois Clay Products Co.*

For free copy circle No. 6 on postcard, p. 81

## Aluminized wire products

Wires that have the strength of steel and the corrosion resistance of aluminum are described in a colorful six page flyer. Applications of this high ductile wire, whose coatings withstand forming operations and a one diam wrapping test without fracture include: chain link fencing and barbed wire; ASCR core wire; strands for ground, guy and messenger wires; telephone wire; tie wire; and lashing wire are detailed. Page

*Steel & Wire Rope Div., American Chain & Cable Co., Inc.*

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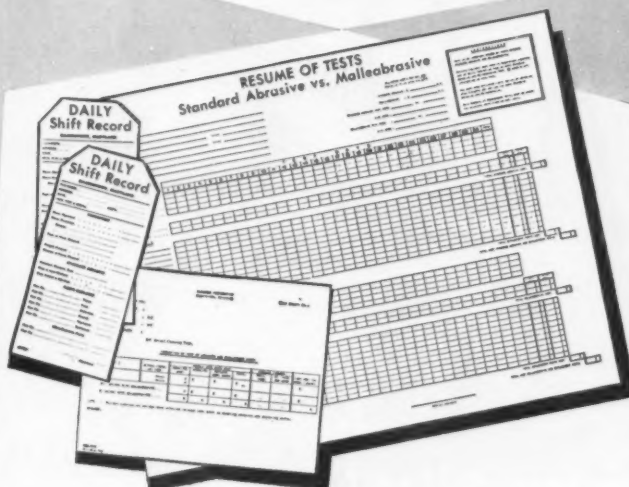
## Containers

Twelve-page catalog is available on steel mesh container models. One section is devoted to models designed for warehouse use, another on units designed for vertical storage of parts and equipment. *Union Steel Products Co.*

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# MALLEABRASIVE

- PUT THE "test"  
IN testing!



The only real test of any abrasive is its cost per ton of castings —obtained only by completely recorded use in production.

Malleabrasive was the first metal abrasive to be sold on the basis of recorded production performance in user's plants. The fact is, in its early stages of limited production, we sold it only to those who would agree to run recorded comparative tests. Yes, Malleabrasive really "put the test in testing"—really started all of this testing business!

Malleabrasive's economy has since been proven in hundreds of plants, so there are no restrictions on its sale any more. But—we do say, if extravagant claims and gimmick-guarantees are offered you that some other abrasives are cheaper for you than Malleabrasive, the only way to get the facts is to run recorded tests of both materials. Don't depend on generalities.

Samples of the test record forms used to establish Malleabrasive's economy will be sent on request. Write us.

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STEEL ABRASIVE COMPANY  
MANSFIELD, OHIO

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"NOW IN EASY TO HANDLE  
50-POUND DOUBLE BURLAP BAGS"



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Fischer precision-turned aluminum nuts set new standards of uniformity and accuracy that speed assembly operations... reduce costs.

Standard types and sizes or "specials", you pay no premium for this extra quality... Fischer turned aluminum nuts cost no more than those produced by other, less exact methods.

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C-308-FS



445 MORGAN ST. • CINCINNATI 6, OHIO

## Tractor bulletins

Four new two page bulletins describe on completely redesigned Huskie and Super-Huskie gasoline tractors. Bulletins cover models with maximum drawbar pull of 3000, 4000 and 5000 lb respectively. Information is included on truck performance, dimensions and weight, power plant, drive axle, steering system, contactor controls, brakes, springs (full spring suspension), tires, fuel supply, instruments, drawhead and lubrication. *Mercury Mfg. Co.*

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## How tight's tight?

To an age-old, machine-shop query of how tight is tight, one firm has come up with an answer in a four-page folder. Or rather, the company has come up with an answer for cap screws, a product it says it makes more of than any other company in the world. A cap screw is ideally tight when it is tightened with a wrench more than it ever will be in use, it says. Brief text and illustrations expound on tight cap screw philosophy. *The Cleveland Cap Screw Co.*

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## Leak detector

Four-page catalog and price list reports on company's leak detector. Folder says precise location of leaks in pressure, vacuum, and hermetically sealed equipment is provided with low cost, portable detector. Responding to the presence of helium used as a tracer gas, the instrument is said to be capable of the most exacting tests of either evacuated or pressurized systems. *Consolidated Electrodynamics Corp.*

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## Steel castings

Corrosion resistant stainless steels chart identifies ACI and Empire designations with corresponding AISI type number, ASTM and "other designations and trade names of similar alloys." It also shows percentages of principal alloying elements and typical mechanical properties for 23 steels. *Empire Steel Castings, Inc.*

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INSULATING FIRE BRICK	Temp. Limit	Density (lb/cu ft)	Strength (cold crushing, psi)	Conductivity (Btu in. sq ft F. hr at 1000F mean temp.)
JM-3000	3000F*	64	400	3.20
JM-28	2800F*	58	150	2.50
JM-26	2600F*	48	190	2.22
JM-23	2300F*	42	170	1.91
JM-20	2000F*	35	115	1.22
JM-1620	1600F* 2000F**	29	70	1.02
Sil-O-Cel <sup>®</sup> Super	2500F**	40	300	1.95
Sil-O-Cel C-22	2000F**	38	700	1.88
Sil-O-Cel 16L	1600F*	34	350	1.07

\*Back-up or exposed  
\*\*Back-up only



*From Johns-Manville refractory research...*

## insulating fire brick with balanced properties for unsurpassed heat-control effectiveness

The nine types of insulating fire brick produced by Johns-Manville offer furnace builders and operators a common advantage—*balanced properties!*

The Johns-Manville insulating brick formulated for your service gives you the ideal combination of physical and thermal properties without sacrificing one for the other. This means you get unsurpassed heat-control effectiveness... greater economy in furnace design... hours saved

in reaching operating temperatures!

For a good example of the value of *balanced properties*, take the proved performance of JM-3000 insulating fire brick. Formulated for 3000F temperature service, this insulating fire brick has unusual load bearing strength, high spall resistance, low shrinkage and thermal conductivity proportionate to its density.

Johns-Manville has two strategically located plants for the production

of insulating brick: Lompoc, California and Zelienople, Pennsylvania. Insulating brick are available from the stocks of authorized J-M distributors in key industrial areas.

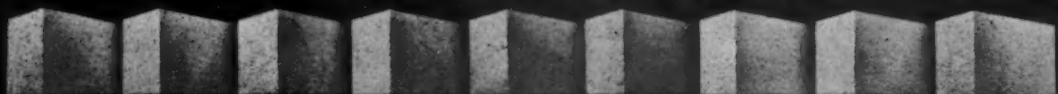
For complete information, call your nearest J-M representative. Or write for brochure IN-115A to Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario.



**Johns-Manville**

**REFRACTORY AND  
INSULATING REFRACTORY PRODUCTS**

THE INDUSTRY'S MOST COMPLETE LINE OF INSULATING FIRE BRICK



JM-3000 for temperatures to 3000F    JM-28 for temperatures to 2800F    JM-26 for temperatures to 2600F    JM-23 for temperatures to 2300F    JM-20 for temperatures to 2000F    JM-1620 for temperatures to 1600F exposed, to 2000F back-up    Sil-O-Cel Super for temperatures to 2500F, back-up    Sil-O-Cel C-22 for temperatures to 2000F, back-up    Sil-O-Cel 16L for temperatures to 1600F back-up or exposed



controlled . . . every step of the way!

## VANCORAM FERROCHROMIUM



When you specify Vancoram Ferrochromium, you know in advance—and for sure—that every shipment of these high-grade alloys will meet the highest standards of quality and uniformity.

Why? Because every step in its production is controlled. Vanadium Corporation mines it—mills it—smelts it!

In addition, Vanadium's Technical Staff works constantly to improve product quality and help

customers in the proper application of Vancoram products to their processes.

Remember, too—there's a type and grade of Vancoram ferrochromium for every application—stainless, tool and constructional alloy steels, and for use in the iron foundry industry.

For prompt service, just call your nearest Vanadium Corporation office.

There's always that extra margin of quality in products which carry the Vancoram label.



### VANADIUM CORPORATION OF AMERICA

420 Lexington Avenue, New York 17, N. Y. • Pittsburgh • Chicago • Detroit • Cleveland  
Producers of alloys, metals and chemicals



# FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 76

## Aircraft bolts

Manufacture of aircraft quality bolts, from original wire stock to finished product, is described in a new 12 page booklet. It starts with explanation of quality control measures employed during manufacture. Booklet outlines: cold heading, bolt trimming, roll threading, heat treating, electro plating, magnaflux inspection and final inspection. Final pages deal with packing and shipping. *Aero Supply Mfg. Co.*

For free copy circle No. 13 on postcard

## Temperature controls

Condensed eight page catalog contains model illustrations and brief descriptions of temperature controls and allied equipment for industrial heating and refrigeration for applications ranging from  $-30^{\circ}$  to  $+1200^{\circ}\text{F}$ . Included are recording controls, indicating controls, non-indicating controls (electrical and mechanical), thermometers, bulb installation accessories, how to order thermal elements, process timers, and safety gas pilots. Basic price data is included. *The Partlow Corp.*

For free copy circle No. 14 on postcard

## Carbide tools, tips

Revised 32 page booklet gives detailed information, charts and other data on carbide applications and available tools with carbide tips. It gives data on all firm's products including standard, insert throw-away and special blanks; standard tools, die sections and punches, die inserts, piercing punches and bushings. There is also a section on the selection of carbide grades. *Carmet Div., Allegheny Ludlum Steel Corp.*

For free copy circle No. 15 on postcard

## Refractories

A bi-monthly technical bulletin describes properties, uses, and recent development in one company's refractories. It is designed to give a clearer understanding of what they are, where and when to use them, and how to use them effectively. The text is liberally supported with tables and illustrations. *The Carborundum Co.*

For free copy circle No. 16 on postcard

## Welding products

Four page two-color catalog provides prices and stock sizes of "Timang" manganese - nickel - steel welding products, including rods, hot-rolled plates, special shapes, wedge bars, tooth repointers and applicator bars. It contains handy application information. *Taylor-Wharton Div., Harsco Corp.*

For free copy circle No. 17 on postcard

## Quarter-ton crane

Descriptive literature of firm's new crane, the quarter-tonner with swing-around boom, is now available. This new crane, just added to company's line, is said to offer for the first time the advantage of a truck crane's swinging boom, in a floor crane. *Ruger Equipment, Inc.*

For free copy circle No. 18 on postcard

## Furnace accessories

An eight page catalog describes auxiliary items commonly used in conjunction with foundry melting furnaces. Replacement linings, high temperature cements, silicon-carbide base blocks, oil burners, blowers, cast iron pots, and oil or gas fired bell ladle heaters are listed. *Lindberg-Fisher Div., Lindberg Engineering Co.*

For free copy circle No. 19 on postcard

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. 7/26/56

Circle numbers for Free Technical Literature or Information on New Equipment:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
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If you want more details on products advertised in this issue fill in below:

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FIRST CLASS  
PERMIT No. 36  
(Sec. 34.9 P.L.R.R.)  
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THE IRON AGE

Post Office Box 77  
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NEW YORK 14, N. Y.

**Silver process finish**

One company's bright silver plating process is described as giving a mirror bright finish directly from the bath through a complete range from flash to extra heavy deposits in a new eight page brochure. Other features: hard (Brinnell 135) and ductile deposits, room temperature operation, less fumes, less tendency toward bath decomposition, noncritical, economical operation and control, operable in a wide range of current densities (from 10 to 40 amp per sq ft, and exceptional throwing power affording uniform plating thickness even in "blind holes" and crevices. *Sel-Rez Precious Metals, Inc.*

For free copy circle No. 20 on postcard

**Bottled atmosphere**

Fact sheet by a controlled atmosphere furnace manufacturer gives rundown on a development in protective atmospheres. It introduces a new cylinder gas that is described as "a ready-to-use bottled atmosphere." Said to be simple to use, it is said to eliminate need for complicated atmosphere generators and dissociators. Just connect a cylinder to your furnace it says, open a valve and it's working. It's non-explosive and non-inflammable, according to literature. *Delaware Tool Steel Corp.*

For free copy circle No. 21 on postcard

**Surface equipment**

Handy eight page catalog of firm's precision surface equipment is now available. This has information including prices on angle plates, V-blocks, box parallels, universal right angle irons. It covers a wide range of types of surface plate equipment for tool room use, pattern shops, precision set-up assembly and testing. *Challenge Machinery Co.*

For free copy circle No. 22 on postcard

**Spark plug catalog**

A new 24-page spark plug catalog contains complete spark plug specifications covering company's standard, transport, resistor, small engine, shielded and marine spark plugs. Information on firm's new Resistor Spark Plug with power tip is included. *The Electric Auto-Lite Co.*

For free copy circle No. 23 on postcard

**Large nuts**

Purchasing agents, engineers and production executives of companies building large machine equipment, large presses, large engines, as well as those engaged in railroading, marine and other activities where large fasteners are required are expected to show interest in a new 36-page catalog on large nuts. Complete buying manual lists specifications and prices of large hex, square and special nuts ranging in size from 1 3/4 to 8 in. Each size is arranged on a single page. Other special large nuts available, although not priced, are listed. In addition, an introduction describes company's 85 yr. history and background. *Jos. Dyson & Sons, Inc.*

For free copy circle No. 24 on postcard

**Toolholders**

Manufacturer has issued a new 24 page catalog describing its line of toolholders and carbide inserts. It covers both positive and negative rake toolholders utilizing throw-away inserts and negative rake toolholders using standard inserts up to 1 1/2 in. long. These toolholders are said to handle an estimated 90 pct of all machining operations. Both carbide and ceramic inserts can be used. It includes illustrations of various toolholder styles to replace standard brazed carbide tools plus physical dimensions, prices and ordering information for toolholders and square, triangular and round carbide inserts. *Vascoloy-Ramet Corp.*

For free copy circle No. 25 on postcard

**Shearing machines**

Dozen page, four-color folder contains brief descriptions and photographs of company's line of production "guillotine" shearing machines. It covers three models: a four ft model 48/10, a six ft model 72/10 and an eight ft model 96/10 wide to handle mild steel plate up to 1/2 in. thick. Booklet says that machines incorporate all the modern ideas in shearing with the sturdy construction of the well-tried earlier type, affording accurate cutting and fast speed. Two pages cover extra equipment and a page of specifications is included. *F. J. Edwards, Ltd.*

For free copy circle No. 26 on postcard

**BUSINESS REPLY CARD**  
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**THE IRON AGE**

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FIRST CLASS  
PERMIT NO. 36  
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Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. 7/26/56

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Company .....

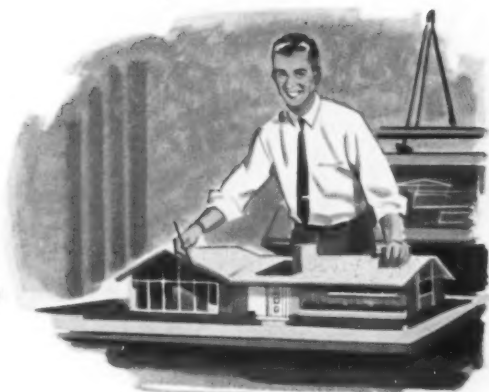
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City .....Zone .....

State .....

in the home  
everybody  
benefits from

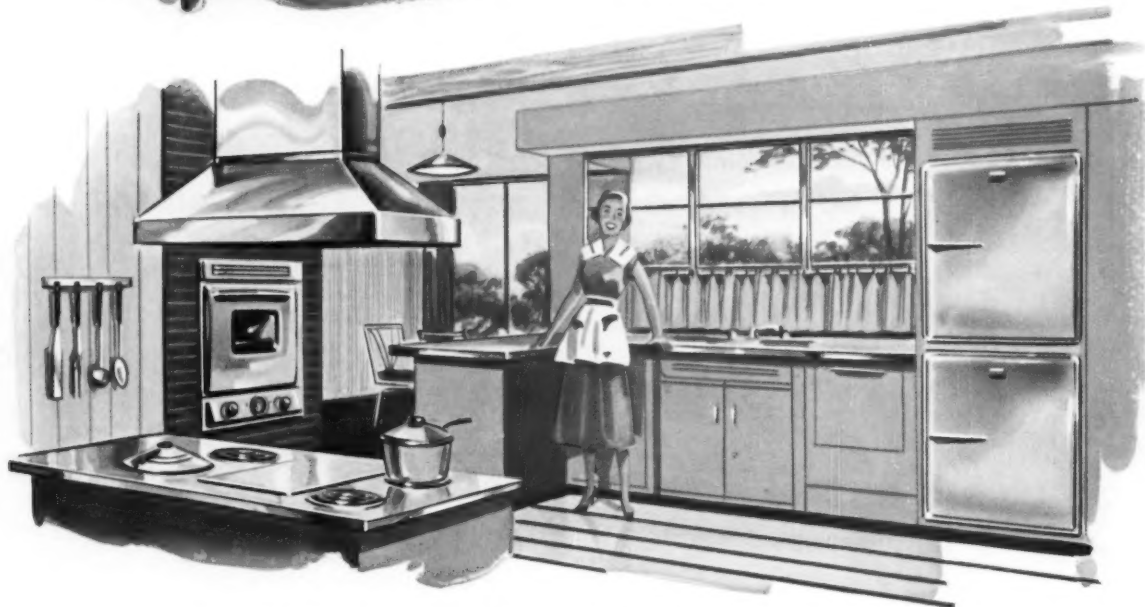
# STAINLESS STEEL



THE ARCHITECT designs Stainless Steel into windows, kitchens, work surfaces, ovens and other important places because he knows there is nothing like Stainless for clean, lasting beauty.



THE BUILDER has had long experience with Stainless Steel. It's easy to install, does not chip or peel, and its beautiful finish presents no problem on matching or replacement.



**the owner** likes living with Stainless Steel. It's always gleaming and beautiful, cleans with a wipe, and lasts forever. And, to complement her kitchen she loves to own those shiny pots, pans, tableware, and appliances, all made of Stainless Steel.

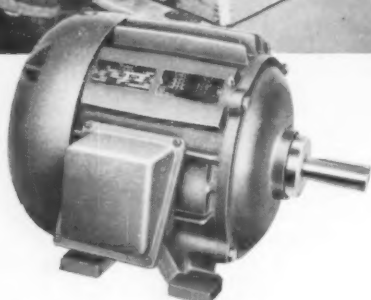
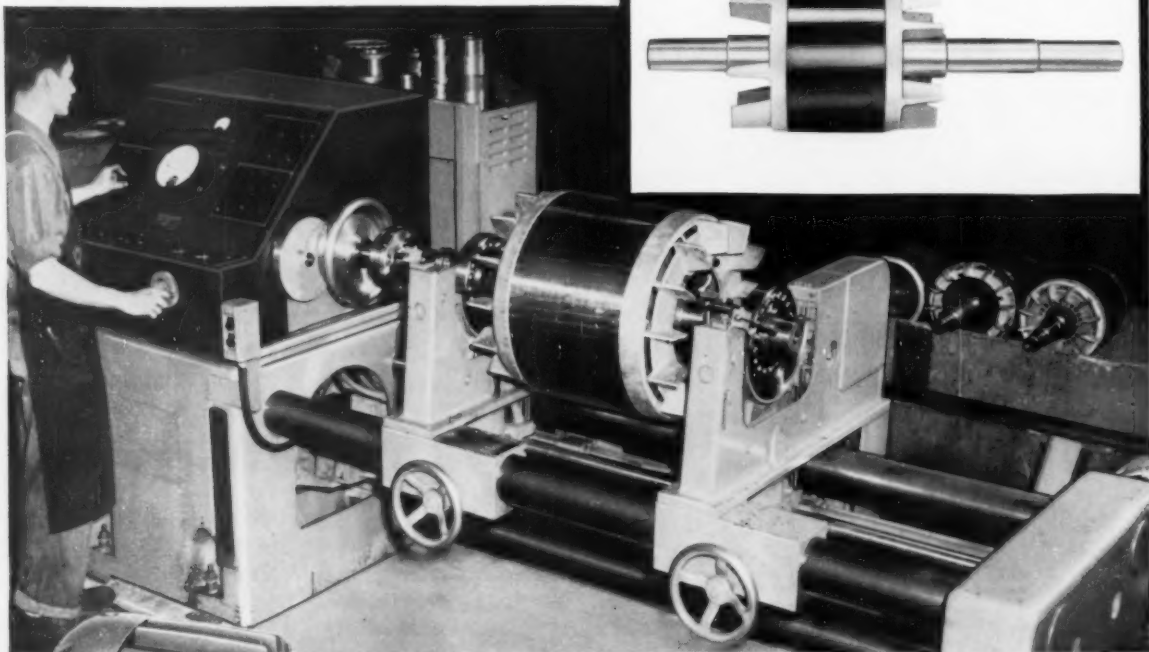
## McLOUTH STAINLESS STEEL



FOR THE PRODUCT YOU MAKE TODAY AND THE PRODUCT YOU PLAN FOR  
TOMORROW SPECIFY McLOUTH HIGH QUALITY SHEET AND STRIP STAINLESS STEEL

McLOUTH STEEL CORPORATION DETROIT, MICHIGAN • MANUFACTURERS OF STAINLESS AND CARBON STEELS

WAGNER ELECTRIC MOTORS...  
THE CHOICE OF LEADERS IN INDUSTRY



Wagner totally-enclosed fan-cooled motor.  
1 through 30 hp, NEMA Frames 182-326U.



Wagner open type drip-proof motor.  
1 through 30 hp, NEMA Frames 182-326U.

## All Wagner Motors are *DYNAMICALLY BALANCED* for smooth performance

Motor balance is important to fine machine tool performance. A well-balanced motor greatly reduces vibration—allows your machine tools to turn out the accurate work for which they are designed.

*Every rotor*, even in the smallest fractional hp rating, used in a Wagner Motor is dynamically balanced on balancing machines like that shown above.

Your selection of Wagner Motors for your machine tool applications gives you other benefits, too. You can specify totally-enclosed motors that are fully protected against damage from filings, chips, dirt, fumes, moisture; or open type drip-proof motors—in ratings through 500 hp. You add an extra selling point—Wagner Motors are *known* for dependable performance. You assure users freedom from costly motor maintenance and even more costly down-time. And—you give your customers motors that can get on-the-spot service when needed—anywhere in the United States.

M56-9



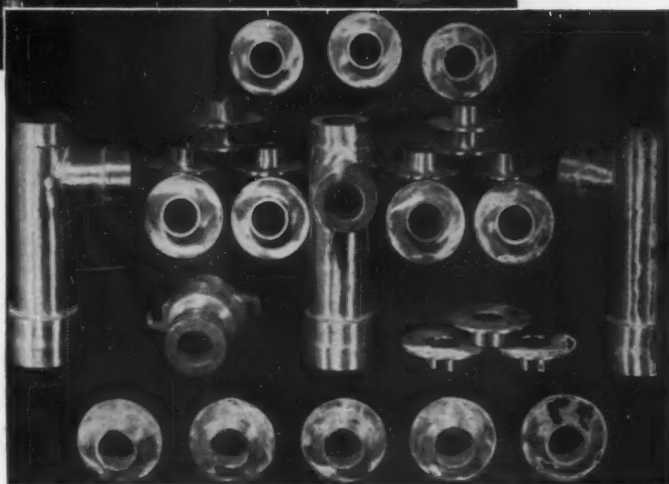
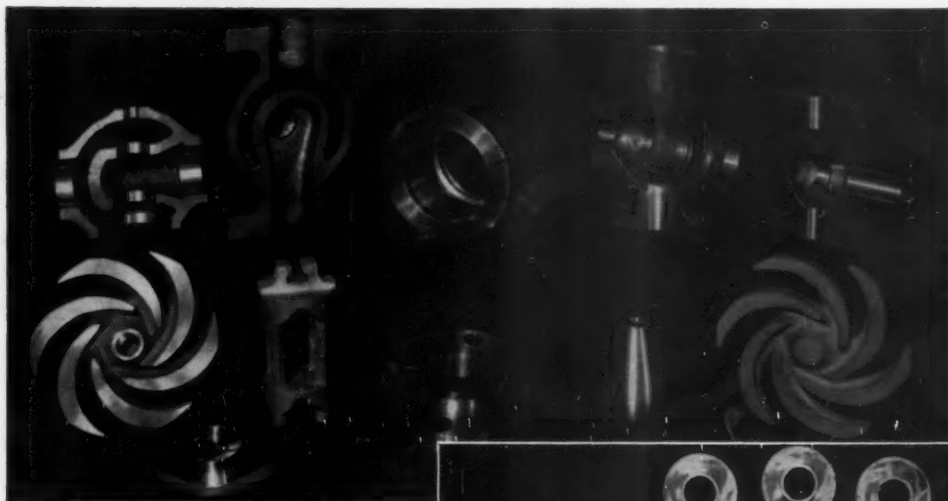
### Wagner Electric Corporation

6403 Plymouth Ave., St. Louis 14, Mo., U.S.A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES • AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC





This is the mark that means  
clean, sound Stainless Castings all the time



Write for this book on  
**AL STAINLESS STEEL  
CASTINGS**

32 pages of valuable and complete data on stainless castings: analyses, properties, technical data on handling and heat treatment, typical applications, how to order, etc.

ADDRESS DEPT. A 791

Every stainless casting produced by our Buffalo Foundry carries the familiar "AL Star" trademark, cast into the steel. That means it's Allegheny Ludlum *time-tested* stainless steel—a pioneer that has successfully answered thousands of difficult corrosion and heat resisting problems.

It not only means experience in stainless casting applications, but in maintained high quality, too. The AL Buffalo Foundry is a pioneer in both the vertical-centrifugal and static methods of casting

stainless steel. You can depend upon AL Stainless Steel Castings to be strong, clean-surfaced, sound-structured and easy-machining . . . fully in accord with the service conditions and with your requirements for delivery.

Let our stainless foundry specialists quote on *your* problem jobs—any shape casting or any size, up to thousands of pounds. • *Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pennsylvania.*

For Stainless Steel in ALL Forms—call  
**Allegheny Ludlum**

Warehouse stocks carried by all Ryerson Steel plants



WSW 8007 C



**STEELETT'S®**  
**COST LESS..**  
**CLEAN BEST**

Steeletts bring to industry a new grit with all the advantages of high carbon steel to rewrite the story of GRIT blasting costs. For the first time, hardness has been combined with toughness in a single grit to provide maximum efficiency at the lowest possible cost.

**OUTWEAR CHILLED  
IRON 5 TO 1**

For cleaning heat treated work, Steeletts outlasted chilled iron 5 to 1 at Commercial Steel Treating Corporation, Detroit, Michigan. Its hardness and toughness enabled this sharp reduction in abrasive consumption. This longer life is also reflected in greatly decreased blast cleaning machine maintenance.

**PACKAGED IN 50-LB. CARTONS**



For complete information on Steeletts, send for Bulletin 901-D.

**WHEELABRATOR  
CORPORATION**

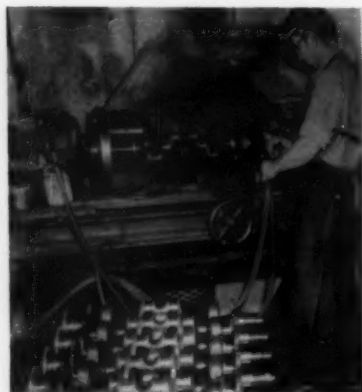
510 S. Byrkit Street  
Mishawaka, Indiana

## COATING: Aids Crankshafts

**Automaker finds metallizing cuts reject rate . . . Imparted hardness and granular structure of metal makes exceptionally fine bearing surfaces . . . Savings are important factor.**

American Motors Corp.'s plant at Kenosha, Wis., has been making effective use of their metallizing equipment for many years. However, it was in 1950 that they first began the salvage operation that has since saved them, by their own estimate, over a half a million dollars.

In the crankshaft assembly section there was a stockpile of apparently finished crankshafts. Though not visible to the naked eye, these shafts were not perfect. If placed in new automobiles they



**After cleaning with emery cloth, worker metallizes crankshaft.**

would have caused owner dissatisfaction, dealer unhappiness and company management headaches. As in any assembly line production setup, a certain percentage of these crankshafts, prior to 1950, when slightly but improperly ground, had to be scrapped at an obvious loss.

### Surpassed All Requirements

It was found by Metallizing Engineering Co., Inc., Westbury, N. Y., engineers that sprayed crankshafts surpassed all quality requirements. This was due pri-

### WANT MORE DATA?

**You may secure additional information on any item briefed in this section by using the reply card on page 81. Just indicate the page on which it appears. Be sure to note exactly the information wanted.**

marily to the hardness and granular structure of the metal which is said to provide an exceptionally fine bearing surface.

American Motors metallizes 50 crankshafts a day, five days a wk, 50 wks a year. The actual dollars and cents saving per unit works out this way, says METCO: Mfg cost of a crankshaft at this point is \$16.00 while scrap value would be about \$1.50. The metallizing and finishing cost about \$4.00 or a net saving of slightly over \$10.00 on each part. Thus their savings since early 1950 have been well over \$600,000 and the equipment is also used for other work of lesser importance.

The actual metallizing work is seemingly simple: (1) Fresh emery cloth mechanically cleans area to be built up. (2) Portions adjacent to work area are masked off with ordinary "Scotch" tape to prevent adherence of metal where it would have to be removed. (3) Operator applies material with his metallizing gun (finished thicknesses vary from 0.010 to 0.040 in.), and (4) Finish grinding.

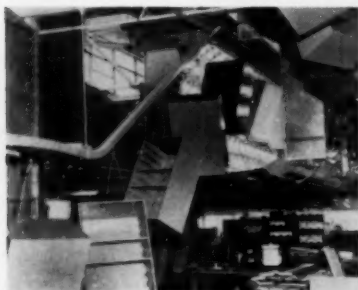
There are many other uses for metallizing guns at the motors firm. They also salvage rear axle drive pinions, differential housings, differential cases and camshafts.

## Finishing:

**"Air-borne" finishing operation speeds production, saves space**

Two compact, pre-engineered ceiling suspended radiant ovens are part of the conveyORIZED painting and baking system installed in the new one-story plant of The Wright Line, Inc., Mfg. Div., Worcester, Mass. The firm makes metal office equipment for handling, filing and transporting punched tabulating cards.

The radiant heating equipment was designed and manufactured by The Fostoria Pressed Steel Corp., Fostoria, Ohio. It consists of 28½ ft infrared ovens with 5 x 6 ft tunnel openings, inte-



**After finishing, conveyors take units to overhead ovens.**

grated into automated finishing, assembling and shipping operations.

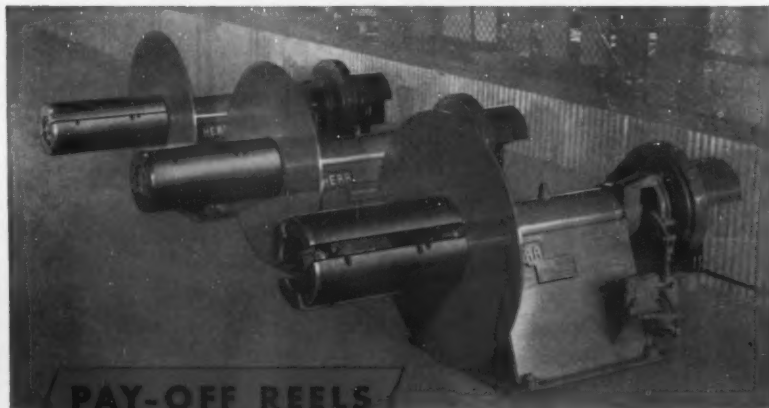
### Overhead Infrared Ovens

After a unique "fine-wrinkle" finish is applied to the units they are conveyed ceiling-ward to pass through overhead infrared ovens. Revolving slowly, they emerge from within 21½ minutes with a uniform one-coat baked wrinkle finish. Oven units operate at 365° F. Still suspended from the mono-rail conveyor, the completely dry and ready to be assembled units are transported to the shipping area.

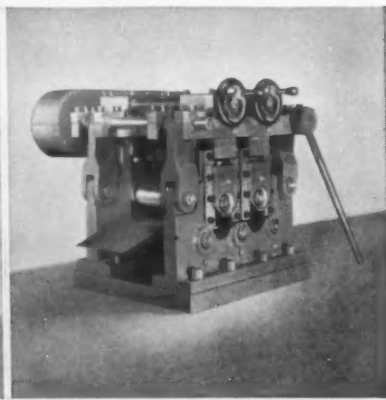
Company officials estimate an invaluable amount of floor space has been gained by suspending their ovens from the ceiling. It has resulted in an uninterrupted work flow and continuous movement through uncluttered aisles.



**"Complete Processing and Handling Equipment . . . for any Ferrous or Non-Ferrous Material . . . That Starts — or Ends — as a Coil"**

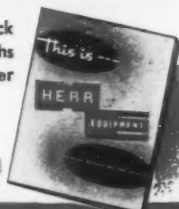


Types and sizes for coils weighing from 5,000 to 50,000 lbs. and up to 84" wide. Fixed, adjustable or automatically aligning bases. Timken bearings. Can be equipped with threading drive, also automatic speed compensating drive for feeding presses.



2-High and 4-High types. Driven and pull-through designs with quick release, for handling an extremely wide range of materials, widths and gauges. Rolls can be rubber covered if desired for easier adjustment and handling high finished materials.

Write for fully descriptive Bulletin No. 561 today!



**THE HERR EQUIPMENT CORPORATION**

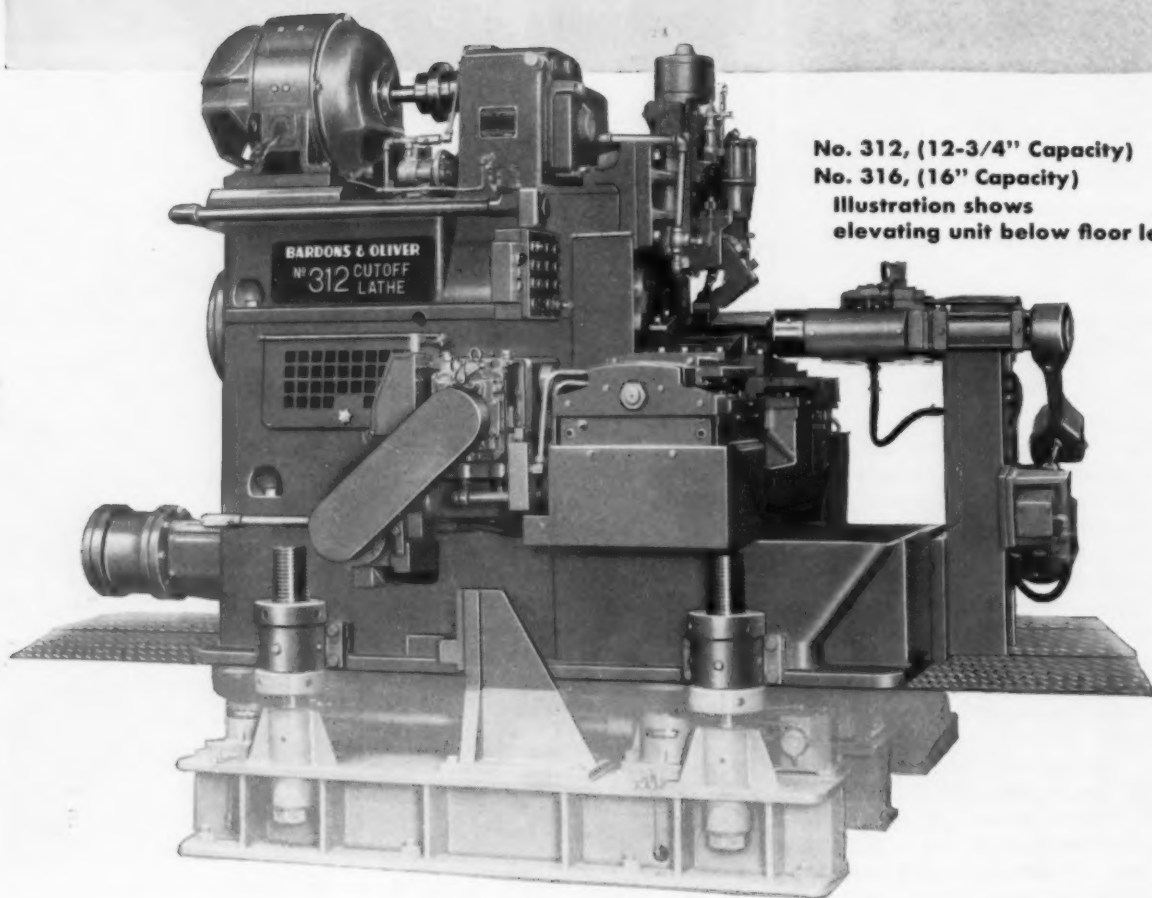
**1260 VINE STREET • WARREN, OHIO**  
CLEVELAND, INDIANAPOLIS AND BERKELEY, CALIFORNIA

# **THE YOUNGSTOWN SHEET & TUBE COMPANY**

has been a user of

**BARDONS & OLIVER**

**Cutting-off Lathes since 1926**



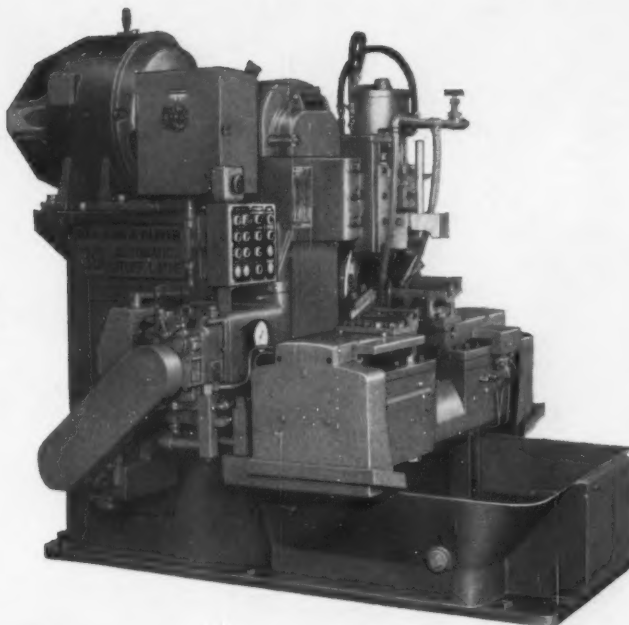
No. 312, (12-3/4" Capacity)

No. 316, (16" Capacity)

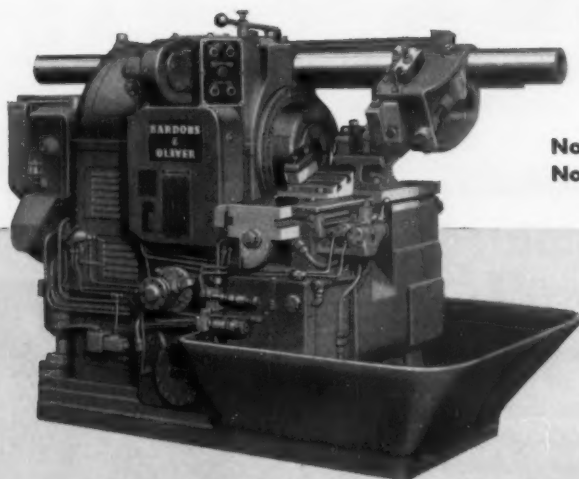
Illustration shows  
elevating unit below floor level



**No. 38, (8-5/8" Capacity)  
No. 39, (9-5/8" Capacity)**



**No. 35, (5-1/2" Capacity)  
No. 36, (6-5/8" Capacity)**



Delivery of eight new Bardons & Oliver Cutting-off Lathes to The Youngstown Sheet & Tube Company will bring the total number in operation to over thirty machines. The Cutting-off Lathes at The Youngstown Sheet & Tube Company range in capacities from 5-1/2 inch to 14 inch diameter.

This large installation certainly represents a vote of confidence for the excellent performance of Bardons & Oliver Cutting-off Lathes... and speaking of confidence, many of the world's leading pipe and tube mills are standardizing on Bardons & Oliver machines. High rate of production, ruggedness, versatility and low maintenance cost make them industry's first choice. In addition to the six sizes illustrated we also manufacture 2", 3" and 4" capacity machines. For complete Cutting-off Lathe information, write us on your company letterhead.

**Manufacturers of a complete line of**

**Turret Lathes and Cutting-off Lathes.**

# **BARDONS & OLIVER, INC.**

1136 WEST 9TH STREET

• CLEVELAND 13, OHIO

# STOP...



## Metal cleaning can be Automated, too!

Don't pyramid your production costs by using hand-operated metal cleaning methods. Detrex cleaning equipment can be built right into your automated line, thus eliminating slow and costly manual labor. In fact, Detrex has been building automated degreasers and washers for years.

Keep your metal cleaning processes in step with the rest of your production. Rely on Detrex quality and experience to maintain the pace. Mail the coupon for complete information on Detrex equipment or check your Sweet's Plant Engineering File.

- ☐ I am interested in automating my \_\_\_\_\_ degreasing \_\_\_\_\_ washing operation.  
☐ Please send literature on standard Detrex equipment.

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 COMPANY \_\_\_\_\_  
 ADDRESS \_\_\_\_\_  
 CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_



## DETREX

### CORPORATION

Dept. A-421

BOX 501, DETROIT 32, MICH.

DEGREASERS • DEGREASING SOLVENTS • WASHERS • ALKALI  
 AND EMULSION CLEANERS • PHOSPHATE COATING PROCESSES

## TECHNICAL BRIEFS

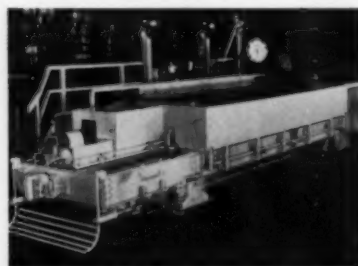
### Handling:

#### Blast furnace scale car built with new design

One of the first new designs in blast furnace scale cars in the industry has recently been reported by Penna. Engineering Corp., New Castle, Pa. It is the first entry into the field by this fabricator and features a different weighing principle as well as an unusually high degree of automation.

#### Speeds of 500 fpm

The car contains two 160 cu ft bins which are air operated, drawing from the same air supply as the air brakes. Self-propelled by two Westinghouse dc motors, it can travel at speeds up to 500 fpm with full load. Weighing equipment consists of an automatic recording Howe scale which, at the press of a button by the operator, weighs the bin loads and automatically records on tape. This unusually rugged scale unit has a company rated capacity of more

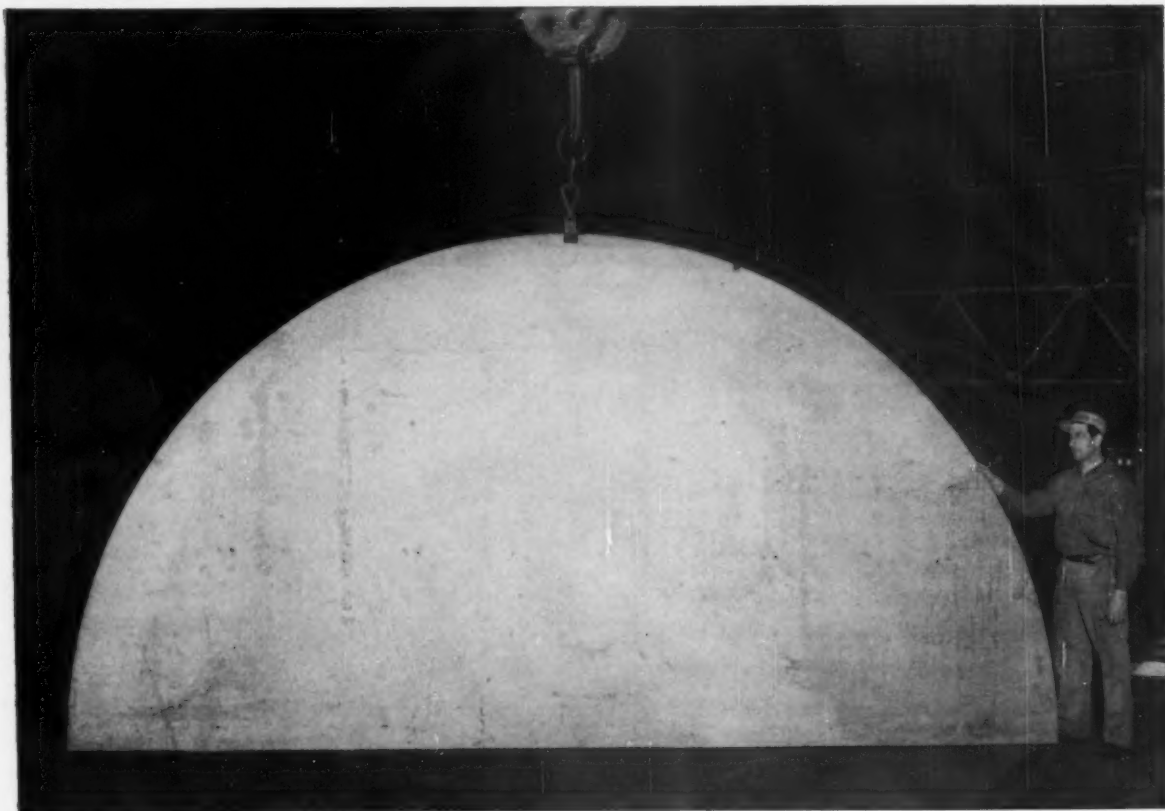


**Self-propelled car has two 160 cu ft air operated bins.**

than 50 pct above operating requirements and has knife edges in the scale which are removable and reversible for easy maintenance. Since the unit operates under ore, coke and limestone stock bins, it is equipped with both headlights and powerful floodlights which illuminate the bins. The entire car is very heavily constructed and properly guarded against falling materials.

#### Unique Safety Devices

A unique series of safety devices have been included in the design of the car, such as a safety



## Carlson specialized service keeps your costs low

**Here's how Carlson specialized service in stainless plate worked on this job.**

The illustration shows one of two segments of a tank head blank. Made of 1" thick, Type 302 stainless steel, the head blank measures 210" in diameter and weighs approximately 9000 pounds. Each segment was produced so accurately the customer did not have to "true up" the abrasive cut straight edges before welding the two segments together. This meant the customer had what he wanted, the way he wanted it—produced to his exact requirements.

**And here's why you'll want this specialized Carlson service.**

More than once we've helped a customer do his job easier, quicker and at lower cost by efficient planning and expert use of specialized equipment. This experience

can work to your advantage, too. You can buy *exactly* what your specifications call for—and nothing more. This saves freight charges on material you cannot use. It also saves the cost and trouble of handling scrap in your shop. And you can set up a faster production schedule based on receiving what you want, when you want it.

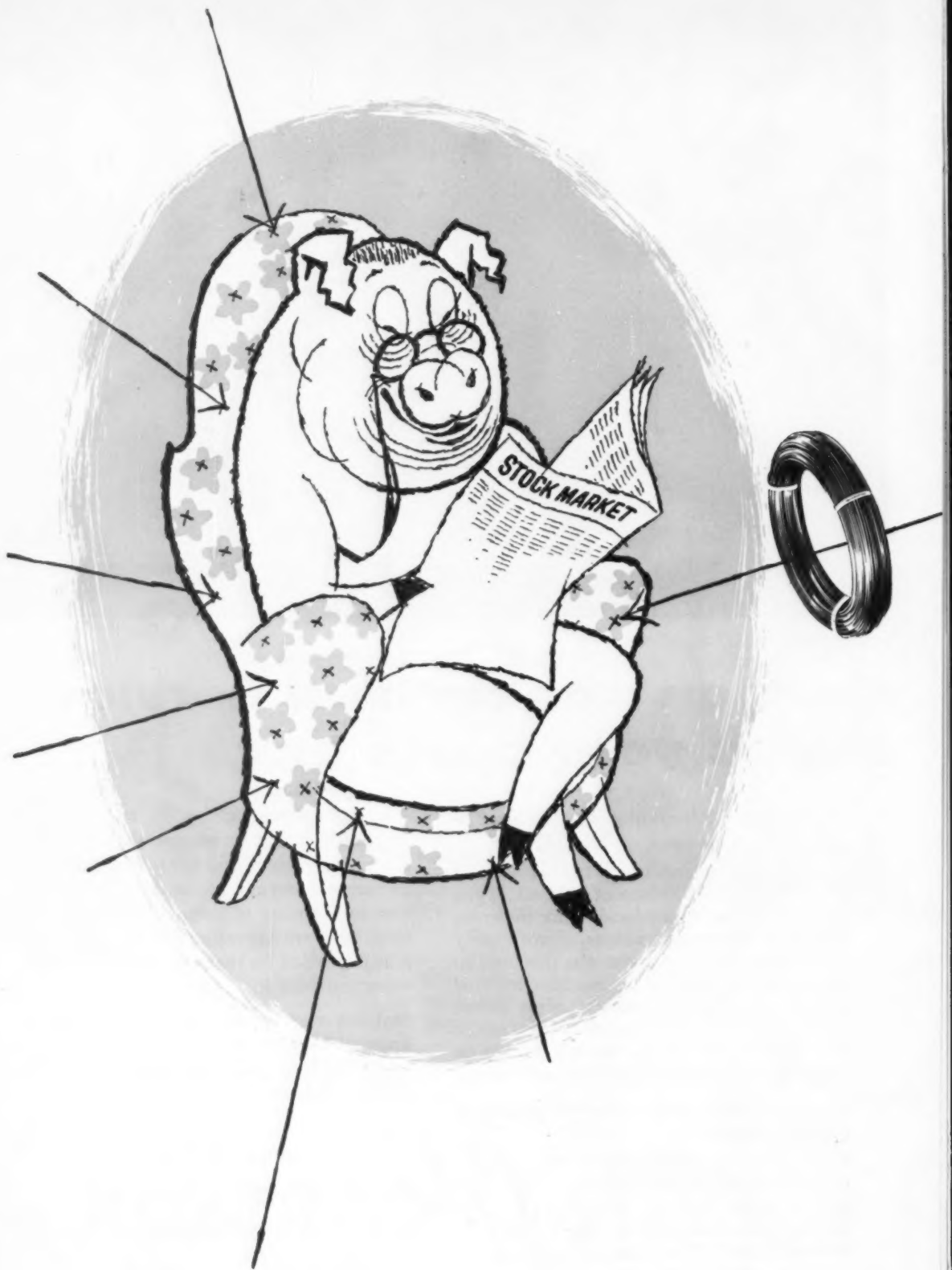
Stainless steel is our *only* business—and we know it! Let us show you how this *specialized service* can help you. Your inquiry will receive prompt attention.

*Stainless Steels Exclusively*  
**G. C. CARLSON, INC.**

**THORNDALE, PENNSYLVANIA**

**Plates • Plate Products • Forgings • Bars • Sheets (No. 1 Finish)**

*District Sales Offices in Principal Cities*





# hog rings that never see a hog

Not all hog rings are used to keep hogs from rooting up the ground with their snouts. One type is used by upholsterers to fasten burlap and similar materials. These rings are often made from a special hard drawn, low carbon CF&I-Wickwire Wire which is free from surface imperfections and wire-drawing lubricants.

Chances are you don't need wire to make hog rings. But you may need one or more of the nearly 100 different categories of specialty wire for which CF&I-Wickwire is famous. Let us show you how we can meet your most rigid chemical and physical specifications on high and low carbon wire in all sizes, shapes, tempers, finishes and grades. Remember—  
**FOR THE WIRE YOU REQUIRE, SEE CF&I-WICKWIRE.**

## IF YOU USE ANY OF THESE WIRES IT'LL PAY YOU TO DISCUSS YOUR NEEDS WITH CF&I-WICKWIRE!

### FLAT AND SHAPED WIRES

Armor Wire  
Bobby Pin Wire  
Bookbinder Wire  
Brush Wire  
Casing Wire  
Cotter Pin Wire  
Curtain Spring Wire  
Die Spring Wire  
Gutter Broom Wire  
Lock Spring Steel  
Rake Tine Steel  
Regulator Spring Wire  
Snake Fishing Steel  
Stapling Wire for Preformed  
Staples (Flat)

### LOW CARBON FINE AND SPECIALTY WIRE

Bee Wire  
Bonnet Wire  
Bookbinder Wire  
Broom Wire  
Clip Wire  
Dent Spacer Wire  
Drapery Pin Wire  
Florist Wire  
Fuse Wire

Glass Netting Wire  
Hairpin Wire  
Hook and Eye Wire  
Mattress Wire  
Picture Cord Wire  
Picker Tooth Wire  
Pin Ticket Wire  
Pin Wire  
Ring Traveller Wire  
Spiral Binding Wire  
Stapling Wire  
Stapling Wire for Preformed  
Staples  
Stone Wire  
Weaving Wire  
Weaving Wire for Fly Screen Cloth  
Wissco Iron Wire

### HIGH CARBON FINE AND SPECIALTY WIRE

Aircraft Cord Wire  
Armature Binding Wire  
Armor Wire  
Belt Hook Wire  
Bobbin Ring Wire  
Brush Wire (Tempered and Untempered)  
Brush Wire (High Strain)

Chrome Vanadium Spring Wire  
Core Wire (Aluminum Cable Steel Reinforced)  
Curtain Spring Wire  
Flexible Shaft Wire  
"Gamma" Spring Wire (Upholstery Spring Wire)  
Zig Zag Wire  
No-Sag Wire  
Hat Wire  
Heddle Wire  
Hose Reinforcement Wire  
Hose Wire, Mechanical  
Hose Wire, Vacuum and Defroster  
Rope Wire  
Signal Corps Wire  
Spoke Wire  
Hard Drawn Spring Wire  
Oil Tempered Wire  
Spheroidized or Annealed Spring Wire  
Tire Bead Wire  
Valve Spring Wire

### MANUFACTURERS LOW CARBON COARSE WIRE

Bag Tie Wire

Basket Handle Wire  
Box Binding Wire  
Brush Handle Wire  
"Cal-Tie" Wire  
Can Key Wire  
Case Hardened Ball Wire  
Chain Wire  
Clamp Wire  
Clothes Pin Wire  
Concrete Wall Reinforcement Wire  
Garment Hanger Wire  
Hay Baling Wire (Coiled)  
Lingo Wire  
Lintel Wire  
Loop Wire  
Merchant Quality Wire  
Pail Bail Wire  
Rivet Wire  
Stapling Wire  
Strand Wire  
Tying Wire  
Welding Wire  
Wissco Iron Wire  
Industrial Quality Wire  
Cold Rolling Quality Wire  
Heading, Forging or Roll Threading Quality Wire  
Medium High Carbon Wire

## CF&I-WICKWIRE WIRE THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Casper • Denver  
El Paso • Ft. Worth • Houston • Kansas City • Lincoln (Nebr.) • Oklahoma City • Phoenix • Pueblo • Wichita  
PACIFIC COAST DIVISION—Los Angeles • Oakland • Portland • Salt Lake City • San Francisco • Seattle • Spokane  
WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York  
Philadelphia • CANADIAN REPRESENTATIVES AT: Calgary • Edmonton • Vancouver



4238



Take the  
"GUESSWORK"  
out of  
**METAL  
HARDNESS  
TESTING**

with a **TINIUS OLSEN  
AIR-O-BRINELL\***

The large gauge on this air operated Brinell Hardness Tester shows exactly how much load will be applied BEFORE the test is made. Any Brinell load from 500 kg to 3000 kg is obtained, quickly and accurately. Operator variables are eliminated. Reproducible load application is assured.

In every respect, the Tinius Olsen Air-O-Brinell is the modern answer to more efficient metal hardness testing. Here is the one tester that combines laboratory accuracy with shop ruggedness. Furthermore, this semi-portable tester can be used anywhere that standard air pressure is available—in the lab or right on the production line.

It will pay you to get the facts about the Olsen Air-O-Brinell. Write today for Bulletin 52.

*There's an Olsen for Every Physical Testing Need.*

\*Patents Applied for



Trademark  
Reg. U.S. Pat. Off.

**TINIUS OLSEN**  
**TESTING MACHINE COMPANY**  
2120 EASTON RD. WILLOW GROVE, PA.  
*Testing and Balancing Machines*

linkage that prevents operation of the car while the hoppers are open. A "cow catcher" at each end of the car operates against a spring loaded pin so that when the car strikes any obstruction, the pin moves back against a limit switch which automatically cuts the power and sets the brakes. The car is also equipped with a dead-man control so that if the operator leaves the station, the car will stop automatically. An electric gong is hooked into the control system so that any time power is applied to any motor, the gong will sound continuously.

This first unit by PECor was engineered in collaboration with U. S. Steel Corp. and is going into operation at the Carrie furnaces of U. S. Steel in Munhall, Pa.

## Casting:

**Shell molding is used  
to produce blades**

Formerly flame cut and machined from bar steel and then drilled, ice removing blades of Carrier's automatic flake-ice making machines are now cast by shell molding methods by Bennett-Ireland, Inc., Norwich, N. Y. In addition to the ice removing blades, scraping blades which had previously been welded of four different parts are integrally cast also by shell molding.

According to Carrier development engineers, production of the original steel parts by cutting, machining, drilling and welding created a very costly and lengthy manufacturing process. Now, shell molding of these parts makes possible cost reduction of 50 pct. In addition, the new blades of manganese bronze are said to have better corrosion resistant qualities than the steel parts.

## Split Aluminum Core Box

Bennett-Ireland makes shell cores for the new ice removal blade on a standard Shalco dump shell core machine using a split aluminum core box fitted with ejector pins. Core produces the correct angular rake to the teeth

# You Have to Operate THE NEW "RPMster" to Believe It!

- • • So perfectly balanced and fitted that it's vibrationless!
- • • So smooth in feed and spindle speed adjustment!
- • • So responsive to your commands!

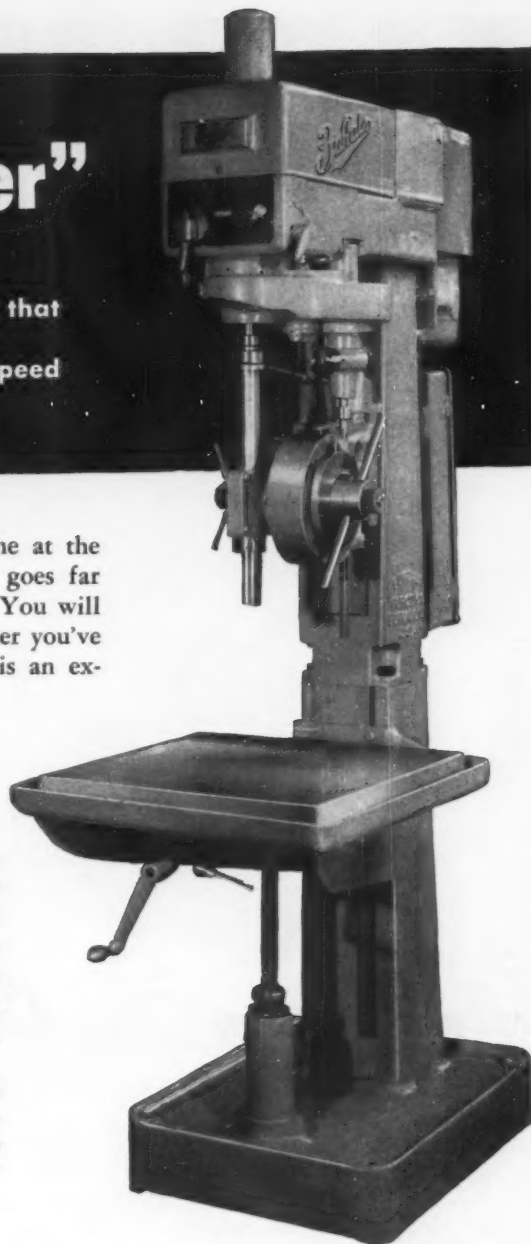
Those who saw this great new drilling machine at the NMTBA Show will verify it. The "RPMster" goes far beyond the ordinary concept of a "drillpress." You will want to have one or more working for you, after you've had the experience of operating one—and it is an experience!

First, its gearless drive and perfectly fitted spindle provide extreme smoothness and quietness of operation.

Second, you can instantly get any low range spindle speed from 100 to 550 R.P.M.s at the touch of a lever—and, by switching to high range in a few seconds, any speed from 500 to 3000 R.P.M.s. Here is the really versatile machine for smooth work flow through the wide range of drilling, reaming and tapping operations.

And as the "Buffalo" power feed obeys your touch, you know you're completely in command of this powerful 88" high machine. The "RPMster" lives up in every way to the "Buffalo" "Q" Factor\* standard of performance.

Your nearby "Buffalo" representative will be glad to arrange a demonstration, or write us.



Buffalo No. 1 "RPMster"—the drill with 1001 instantly changed spindle speeds.

\* The "Q" Factor — *the built-in Quality which provides trouble-free satisfaction and long life.*



## BUFFALO FORGE COMPANY

492 BROADWAY

BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

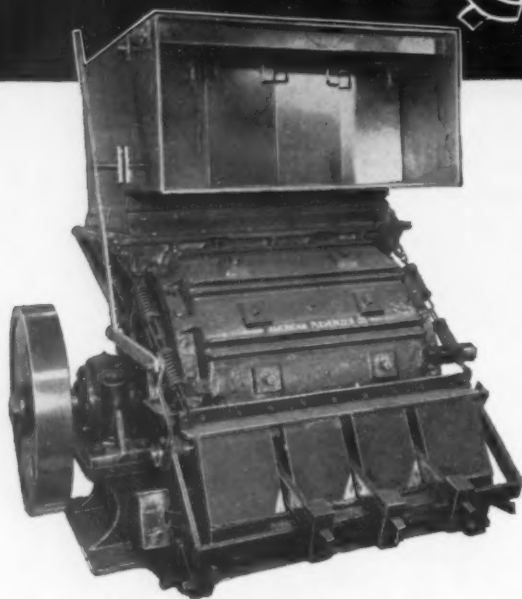
DRILLING

PUNCHING

SHEARING

BENDING

## Here's A Curly Cue To New Market Value For Your Machine Turnings



### *American* METAL TURNINGS *Crusher*

That single machine turning of curled-up steel shown above can be mighty troublesome and costly to your operations.

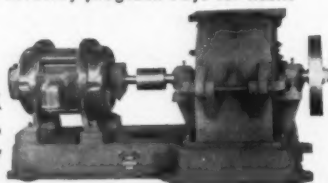
Gnarled up with thousands of others like itself, it becomes a problem in space . . . gallons of re-usable cutting oil are trapped in the folds . . . and the scrap value is greatly minimized.

Answer? Run this tangled waste through an efficient, AMERICAN METAL TURNINGS CRUSHER. Out come sized chips that are easy to handle for shoveling or pneumatic handling . . . easy to store (savings in space up to 75%) . . . easy to spin for oil recovery . . . and crushed turnings command a higher price.

The cost is easy, too, on your scrap recovery program. Pays for itself. WRITE for illustrated literature.

#### RECLAIM FUSED WELDING FLUX

American Hammermill reduces fused flux to fine regranulation for perfect re-use. Why throw away profits! Details on request.



WRITE for Coal Crushing Bulletin

*American*  
PULVERIZER COMPANY

*Designers and Manufacturers of Ring Crushers and Pulverizers*

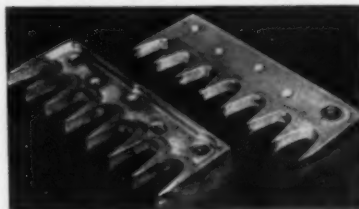
1439 MACKLIND AVE. • ST. LOUIS 10, MO.

#### TECHNICAL BRIEFS

of the blade and permits reduced machine operations. Shell molds are also made on a Shalco machine. Cores are set into the mold and the entire assembly is cemented with a phenolic adhesive. Castings are poured horizontally in high strength manganese bronze. Gates are sawed after cooling and shake out.

#### Finishing the Casting

Finishing the casting is a simple operation: tips of the cutter blade teeth are form milled to in-



Shell molded blade (left) costs less than flame cut part.

sure a  $\pm 0.002$  alignment of the edges and a land width of 1/32 in. Flanks are dressed to remove any excess flash and holes of the gate are ground smooth; casting is then given a final shot blast. Scraping blades of the assembly also involve the same shell molding techniques. This casting is finished by grinding the gate and dressing the cutting lip to the required 30° angle.

Both blades were previously built up by plating with copper, nickel and chrome. Now, cast parts are chrome plated only to provide long-wearing tooth surfaces.

### Inspection:

#### Ultrasonics caravan takes to the road

Ultrasonic inspection equipment fitted into a trailer caravan for plantside demonstrations is being sent by Sperry Products, Inc. of Danbury, Conn., on a 48 state tour of American industrial centers.

Having made its debut at the American Society For Quality Control convention at Montreal,



# TO HIT PAR GO AROUND WATER HOLE!

(or how control keep score low!)

**CHIEF KEOKUK:**

"My golf ball like turtle,  
always head for water."

**PRINCESS WENATCHEE:**

"Little Chief use brains  
... go around water hole."

**CHIEF KEOKUK JR.**

"Control makes golf game good."



Around the 18... or in processing iron and steel, control plays an important role. Many foundries and steel plants control costs and quality with Keokuk Silvery Pig Iron... the superior form of silicon introduction. Pig for pig, car for car, its

uniformity never varies. Handle it by magnet... charge it by weight (or count the piglets for equal accuracy). Leading aluminum producers specify Keokuk Silicon Metal for uniform high purity. When you think of silicon think of Keokuk.



**KEOKUK**

**ELECTRO-METALS COMPANY**

KEOKUK, IOWA

Wenatchee Division, Wenatchee, Washington

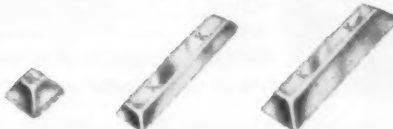
**SALES AGENT: MILLER AND COMPANY**

332 S. Michigan Avenue, Chicago 4, Illinois

3504 Carew Tower, Cincinnati 2, Ohio

8230 Forsyth Blvd., St. Louis 24, Missouri

Keokuk Silvery Pig Iron is available in 60 and 30 pound pigs and 12½ pound piglets... in regular analysis or alloyed with other elements to match your requirements.





Faster finishing of higher quality is made possible by this Binks installation at Imperial Lighting Products Company, Latrobe, Penn.

## "Our finishing output up 30%, quality improved-costs cut..."



says Mr. E. A. Nelson, General Manager, Imperial Lighting Products Company.

**THE PROBLEM:** To improve the finishing operation for aluminum

light fixture parts. Production was continuous but composed of relatively short runs of varying shapes and sizes.

**THE SOLUTION:** A Binks semi-automatic spindle spraying machine. Rotating vertical spindles, mounted on a conveyor, spin the parts to be finished. As the parts pass the operator he coats them quickly and uniformly using a manually operated Binks Model 18 spray gun. The spindles are spaced to accommodate large parts on alternate spindles or smaller parts on every spindle.

**THE RESULTS:** So gratifying, according to Mr. Nelson, that a second Binks semi-automatic spindle machine was installed. Both machines have more than paid for themselves. A third, fully automatic, machine has been ordered for production-rate finishing of small parts.



General view of the semi-automatic machines

- Automatic parts handling speeds production
- Finish is uniform
- Material waste minimized
- Rejects reduced.

### Free analysis and engineering help:

If you would like to know what production rates or costs you could obtain with Binks semi-automatic or automatic spraying machines, Binks research department will run actual test on your products and supply you with a detailed report. Just call your nearest Binks Branch Office or write us direct.

Ask about our spray painting school. Open to all...  
NO TUITION...covers all phases

658

# Binks

EVERYTHING FOR  
SPRAY PAINTING



GUNS



SPRAY BOOTHS



COMPRESSORS

**Binks Manufacturing Company**

3124-30 West Carroll Ave., Chicago 12, Illinois

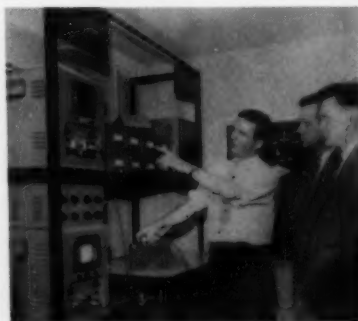
REPRESENTATIVES IN PRINCIPAL U.S. & CANADIAN CITIES • SEE YOUR CLASSIFIED DIRECTORY

## TECHNICAL BRIEFS

Canada, early in June, the caravan returned to the U. S. to head west to the Pacific Coast with initial stops scheduled for Cleveland, Detroit and other cities. It will give plantside demonstrations enroute and is expected to reach the Middle Atlantic states in November.

### Exhibit Worth \$60,000

The \$60,000 exhibit includes operating equipment for contact and immersion testing with the Sperry Simac and Reflectoscope. Included is a combination capable of locat-



Inside, engineers get briefed on ultrasonic test equipment.

ing and evaluating microscopic subsurface flaws in metal as little as 1/4 in. thick and 100 ft long.

The caravan presents also a strip tester for continuous inspection of metal strip. This device is automated, with flaws signalled by light, bell or both, and recorded by camera or on tapes.

### Travelling Laboratory

Visiting industrial plants, for demonstrations conducted by Sperry field engineers, the caravan functions as a travelling laboratory in which metallurgical, quality control and production engineers may learn methods and potentialities of nondestructive testing with ultrasonic instruments.

The tentative travel schedule includes Toledo, Cleveland, Dayton, Cincinnati, Detroit, Chicago, Milwaukee, Spokane, Seattle, Portland, San Francisco, Los Angeles and San Diego. The caravan travels under its own power and generates its own electricity.

# Why Sterling adds a sixth element to your grinding wheel formula



**Y**OUR GRINDING WHEEL'S performance is determined by the five elements that make up its specification: abrasive grain, size, grade, structure, and bond. But in determining the precise formulation of these five elements, Sterling always considers a *sixth* element.

**The sixth element** is the *human* element: the operator himself, his work habits, personal preferences, and all the other little things that make your job unique. Considering the vital sixth element may mean the difference between success and failure on any grinding operation.

**Sterling grinding wheels**—formulated with the sixth element in mind—can cut your grinding costs, reduce grinding time, and get maximum production from your machines. That's why it's sound practice to call in a Sterling Abrasive Engineer, or your nearest Sterling Distributor, for a complete study of your grinding operation. Do it soon.

Sharpening tools and cutters like this milling cutter is cooler, easier with Sterling vitrified cup wheels.



**"Wheels of Industry"**—Vitrified and Resinoid  
—to meet the exact requirements of industry.

## STERLING

## GRINDING



## WHEELS

STERLING GRINDING WHEEL COMPANY, TIFFIN, OHIO—SUBSIDIARY OF ABRASIVE AND METAL PRODUCTS COMPANY

# Bigger Loads...

# Less Spillage



## ...more Productive capacity

It's the amount of bulk-material *delivered* per shift or per day that counts, and the new model HA "PAYLOADER" tractor-shovel has proven in plant after plant that it consistently delivers more material faster and at less cost than heavier machines with larger engines.

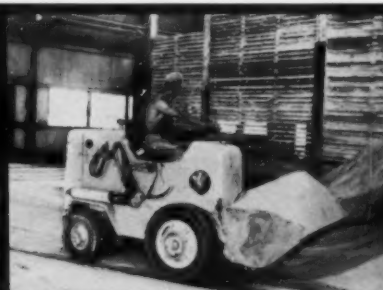
A big reason for this superior performance is the roll-back bucket action that scoops up heaping loads and carries them *low*. Another, is the exclusive built-in hydraulic shock absorber that cushions the load during travel — reducing spillage and allowing higher travel speeds.



**Gets more:** Forty degree tip-back of bucket at ground level gets heaped loads.



**Keeps more:** Maximum bucket tip-back is reached *before* bucket is raised—less spillage at pile.



**Carries more:** Exclusive hydraulic shock absorber cushions the load during transport — less spillage while carrying.





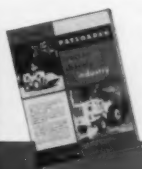
"PAYLOADER" superiority on bulk-material handling work is the result of 34 years of pioneering and leadership in tractor-shovel manufacture. "PAYLOADER" is also the complete, proven line—from 14 cu. ft. to 2¼ cu. yd. capacity—a size for every purpose. There is a nearby Distributor ready to serve you.



**PAYLOADER®**  
MANUFACTURED BY  
**THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.**  
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY



**Delivers more:** You start with a bigger load and—what's more important—arrive with a bigger load.



**FREE . . .**

Owner reports of  
**PAYLOADER**  
performance

This booklet contains performance reports of "PAYLOADER" tractor-shovels in a variety of plants and applications. A copy will be sent on request, without obligation.

**THE FRANK G. HOUGH CO.**  
733 Sunnyside Ave., Libertyville, Ill.

- ☐ Send "PAYLOADER" Reports booklet
- ☐ Literature on Model HA (18 cu. ft.)
- ☐ Literature on larger models—to 2¼ cu. yd.

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

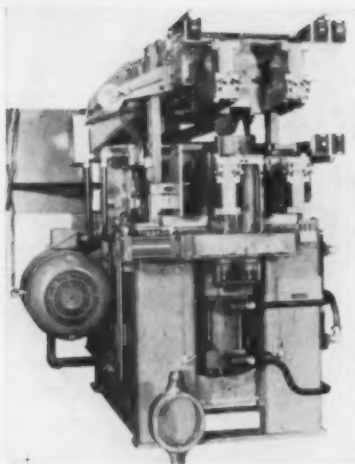
Street \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

## NEW EQUIPMENT

**New and improved production ideas, equipment, services and methods described here offer production economies... for more data use the free postcard on page 81 or 82.**

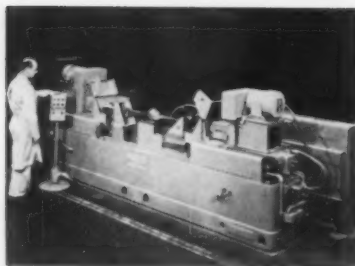


### High production metal removal is done by broaching

Broaching for high-production removal of excess metal is employed with a new hydraulically operated flash trimmer. It is reported to cut labor costs, increase production and reduce scrap over single operation machines normally used. Trimmer is described as particularly adaptable to parts requiring machining after welding. It will trim a number of faces in various planes. Typical flash trimmer shown removes excess metal from arc welds and flanges of automotive rear axle housings at the rate of 200 pieces per hr with one opera-

tor. Housings are placed in a hydraulic positioning clamp, then automatically faced by eight broaches and four single-tooth cutters. The broaching is a draw-cut operation. All operations, including clamping, broaching and trimming, are powered by a rotary-vane hydraulic pump. Hydraulic equipment is mounted on the sides of the unit, readily accessible for maintenance. Broaches and rotary cutters are described by the manufacturer as easy to adjust and replace. *Swift Electric Welder Co.*

For more data circle No. 27 on postcard, p. 81



### Simultaneous boring performed on differential housing

Precision boring on both ends of an automotive differential housing is done with this machine. The steel workpiece, over four ft long, is held between two angle plate fixtures and is stabilized at its mid-section by a horizontal platen. A left hand angle plate is secured to the base. The movable right hand

angle plate is hydraulically actuated, clamping the workpiece flange faces. Locating holes in flange face receive round and two-way locating pins. While boring operations are being done simultaneously 50 in. apart, tolerances are held to close limits. *Heald Mach. Co.*

For more data circle No. 28 on postcard, p. 81



### Unitized design allows building press to own needs

Based on a "unitized" principle of press construction that is considered new to the industry, one firm's designers have developed a line of single action eccentric geared two point presses. The principle involves a quill-mounted flywheel and overhung clutch built into a unitized gear case on which the main motor drive is mounted. Except for the main gears, nothing is built into the crown. As a result, the entire drive can be removed from the press as a unit, and reinstalled, with a minimum of effort, maker says. Other maintenance advantages accrue from the new design.

Belts can be replaced without removing anything but the brake pins. The entire clutch can be taken off by simply removing the brake bracket. The quill assembly, clutch and all, can be taken out of the gear case by removing six screws. Another feature: all presses are available as a "basic" press, with no inbuilding or extras, unless specified. Presses are available in a full line of tonnages in both double and single geared models. Latter have all features, except unitized gear case, which smaller gear number makes unnecessary. *E. W. Bliss Co.*

For more data circle No. 29 on postcard, p. 81



FAIRMOUNT GLASS WORKS, INC.,  
INDIANAPOLIS, IND.

## "We make combustion adjustments in minutes with the Cities Service Heat Prover!"

700 employees . . . 27 acres of plant facilities . . . and a yearly production of 288,000,000 bottles—that's Fairmount Glass Works at Indianapolis, Indiana, a beehive of activity where delays can't be tolerated.

So, when furnace combustion adjustments consistently caused as much as a day's delay and gave poor accuracy, Fairmount had to find something better fast! And they did . . . in the form of the Cities Service Heat Prover. This unique, portable testing instrument makes simultaneous readings of oxygen and combustibles, keeping a constant check on combustion conditions.

Thus, Fairmount's operators are now able to adjust the amount of combustion air to the amount and kind of gas being used . . . and they do it, port by port, in minutes!

In addition, the Heat Prover has proved virtually indispensable in shifting furnaces from producer gas to gas made outside the firm. Says Plant Superintendent Cedric C. Rau, "It's one of the most useful, versatile, and accurate instruments we've ever seen."

The Heat Prover is supplied and maintained free by Cities Service. For further information regarding its availability and uses, write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.



**Checking Combustion in Glass-Melting Furnace,** a Fairmount employee uses the Cities Service Heat Prover for faster, more accurate adjustments. The instrument is supplied free by Cities Service.

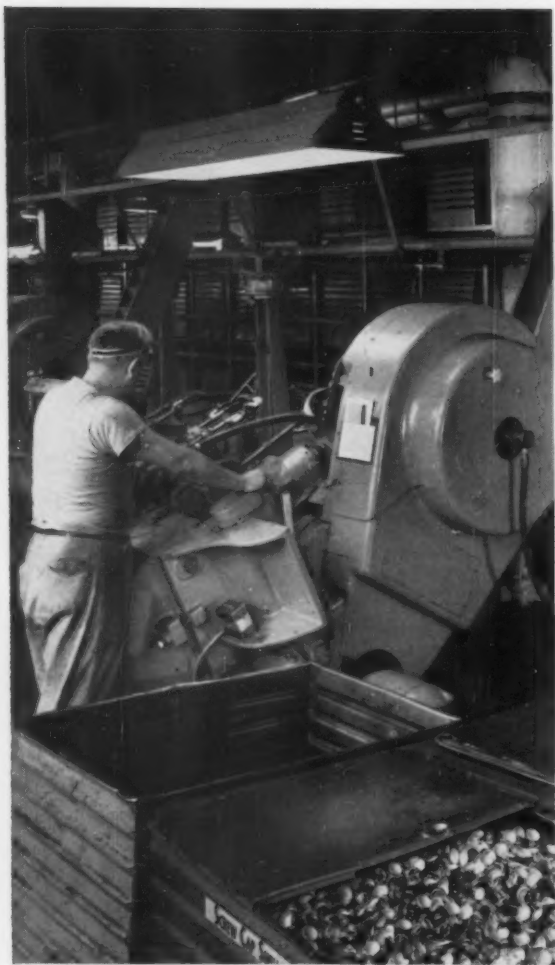
**Production's Never Bottled Up** at Fairmount Glass Works. They produce 288,000,000 bottles a year, use 225-250 tons of glass daily, with many machines turning out 100 bottles a minute!



# CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

July 26, 1956



**SPECIALLY DESIGNED  
solve a problem,**



Corrugated steel construction of these units provides strength, assures long service life. Special channel construction under boxes permits free movement of casters, yet allows four-way entry for lifting and storing.

**REPUBLIC**



*World's Widest Range of Standard Steels*



# REPUBLIC BOXES speed handling ...save space

Today's modern high-speed machines may meet the demand for increased production. But they can also create problems.

This was the case at the Crown & Closure Division of Crown Cork and Seal Company, Inc., Baltimore, Maryland, world's largest maker of metal closures for glass containers.

Their problem was the handling, moving and storing of the tremendous daily output of a battery of screw cap machines. Some of the machines turn out as many as 100,000 screw cap shells per hour. A handling unit was required that could be used to rapidly move the semi-finished caps from the machines to a final manufacturing operation located on another floor—or to a storage area for future use.

Republic Materials Handling Engineers were invited to work on the problem with Crown Cork Engineers. The solution was the design and fabrication by Republic's Pressed Steel Division of the special box-type trucks shown at left.

Equipped with casters, the boxes can be moved easily by hand. A time-saving feature is a hinged door which opens when the box is tilted forward. This permits the caps to slide out and down a chute to the floor below where final manufacturing is completed. The entire handling operation is simplified and speeded. Storage space is conserved.

This is another example of customer service from Republic—another example of experience and versatility in solving a materials handling problem. Perhaps you would like to talk over your handling problems with a Republic Engineer. There's no obligation. Simply contact the nearest Republic Materials Handling Equipment Representative. Or send us the coupon.

# STEEL

*and Steel Products*



**SPEED HANDLING** of heavy materials, like bar stock, with Republic Chain Slings, Attachments and Accessories. All Republic Chain Slings are proof tested and warranted to meet or exceed specifications. They provide an exceptionally high degree of safety. Republic's Bolt and Chain Division makes chain slings in Alloy Steel, High Test Steel and Wrought Iron. Republic chain engineers are always available to help you select the proper chain for your particular requirements.



**SOLVE THE PROBLEM** of storing heavy items with Republic Wedge-Lock Steel Shelving. It is specifically designed for high stacking of enormous weights. As more weight is added joints actually get tighter. Wedge-Lock Steel Shelving provides maximum loading in minimum floor space. It is completely flexible to meet changing space requirements. It can be assembled quickly and easily. Send coupon for full information.

## REPUBLIC STEEL CORPORATION

Dept. C-2189

3104 East 45th Street  
Cleveland 27, Ohio

☐ Send more information on Materials Handling Equipment.  
☐ Have a Materials Handling Engineer call.

Send additional information on:

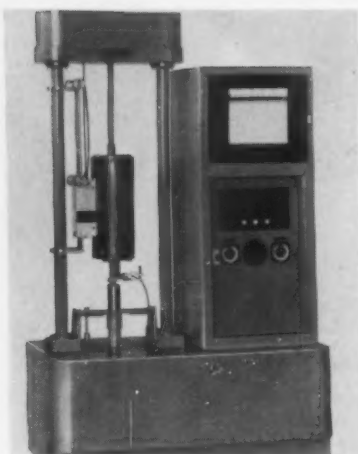
☐ Chain Slings ☐ Wedge-Lock Steel Shelving

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



### Tester keeps fixed extension at any temperature

When testing at elevated temperatures, this automatic testing machine maintains a fixed extension or strain at elevated temperatures. Said to be the first of its kind, the relaxation tester operates on a principle directly opposite to that of the more familiar creep tester. The specimen is inserted in a circular testing furnace mounted between the crossheads. This electric furnace can be used at any temperature up to 1800 to 2000°F with temperatures controlled by a separate unit adjacent to the machine. To perform the test, a pre-

determined extension (in inches per inch) is selected, and the machine started at the desired loading speed. Load is applied until the fixed extension is attained. As the specimen tends to strain further until the influence of increasing temperature and load, the amount of load is automatically reduced to maintain the fixed extension. Controls are mounted in machine's face. All variations of the test are recorded automatically on recorder. *Tinius Olsen Testing Machine Co.*

For more data circle No. 30 on postcard, p. 81

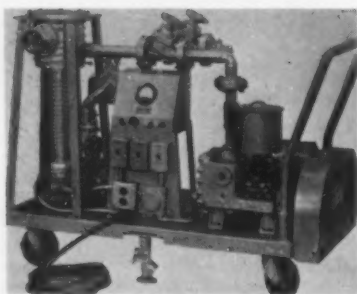


### Shaker is designed for high frequency operation

Manufacturer of shaker systems and random test equipment for calculated vibration control is now producing a new model shaker. This is one of a new series of "wide band" shakers designed for higher frequency operation and lower input requirements. Secondary structural resonances have been so minimized, maker says, that the vibrating armature behaves as a simple rigid body over an extended

frequency range. The first resonance is at approximately 3000 cycles per second (bare table.) Other features: 5000 lb forge rating, sine input and 3450 rms, collinear table motion, 12 sq in. table size, 412 lb load for 10 g vector and 162 lb load for 20 g vector. It has a maximum stroke  $\pm 0.5$  in. with a recommended  $\pm 0.25$  in. for continuous duty. *The Calidyne Co.*

For more data circle No. 31 on postcard, p. 81

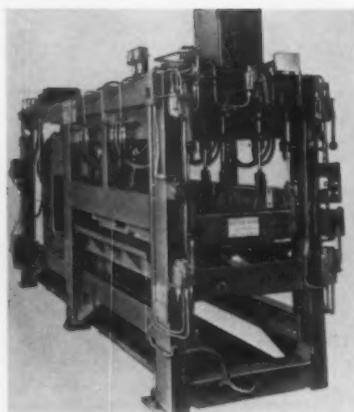


### High vacuum pumping system is portable

For general laboratory work, pilot plant operations and small scale production applications, company has produced a new portable high vacuum pumping system. Designed to attain absolute pressures as low as  $10^{-6}$  mm, system employs a fractionating four in. diffusion pump, connected to a 15 cfm two-stage roughing and backing mechanical

vacuum pump. All components, including electrical control panel, are compactly mounted on a base fitted with two fixed and two swivel wheels, caster lock and pull handle. Service connections required: single phase, 60 cycle, 110-115 v ac outlet, cooling water source. *Kinney Div., N. Y. Air Brake Co.*

For more data circle No. 32 on postcard, p. 81



### Strip mill welders handle up to 80 in. widths

Recently developed and improved, a new line of standard spot welders has been announced. Utilized for welding ends of steel coil stock in continuous strip mill operations, the units join the tailing end of one strip to the leading end of next strip. They handle a wide range of strips to a maximum width of 80 in. Two types are available: single and two strip models. In the double strip unit, both strips can be clamped simultaneously and welded or one strip can be running

while the second strip is clamped and welded. Units are hydraulically operated and are furnished complete with hydraulic power unit and welding control equipment. The traveling "C" frame carries two or four heavy duty mill type welding guns above the strip and two or four below the strip. Unit produces welds to withstand high tension required to pull strips through the mill operations. *Resistance Welder Corp.*

For more data circle No. 33 on postcard, p. 81



*dependable!*

# WEIRTON

**high carbon strip  
cold-rolled spring steel**

*for high-speed blanking or forming*

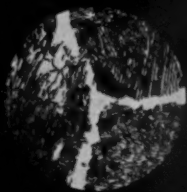
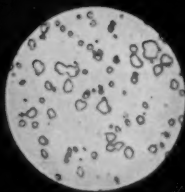
Where high fatigue-resistance is a principal factor, Weirton cold-rolled spring steel furnishes high carbon strip in the consistent uniformity necessary to meet the most exacting requirements of a wide variety of products. The close manufacturing control featured at Weirton results in several unique and highly desirable qualities—such as accurate response to heat treatment . . . uniformity of gauge and width . . . uniform chemical and physical properties . . . exact consistency of grain structure . . . controlled decarburization limits.

Pearlitic and spheroidized structures are available with desired chemical analyses and for specific heat treating and hardness. When you call Weirton you call for easier blanking and cold forming. And, at Weirton, you get what you call for.

**WEIRTON STEEL COMPANY**

Weirton, West Virginia

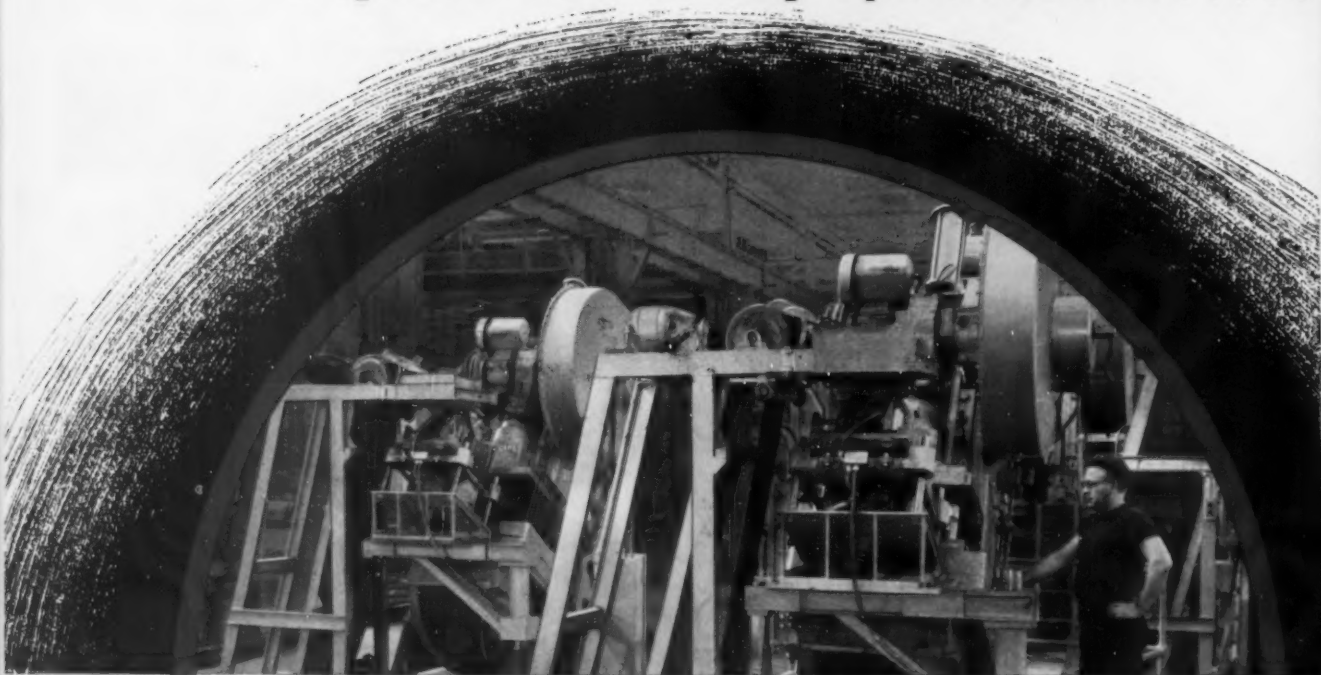
**NATIONAL STEEL CORPORATION**



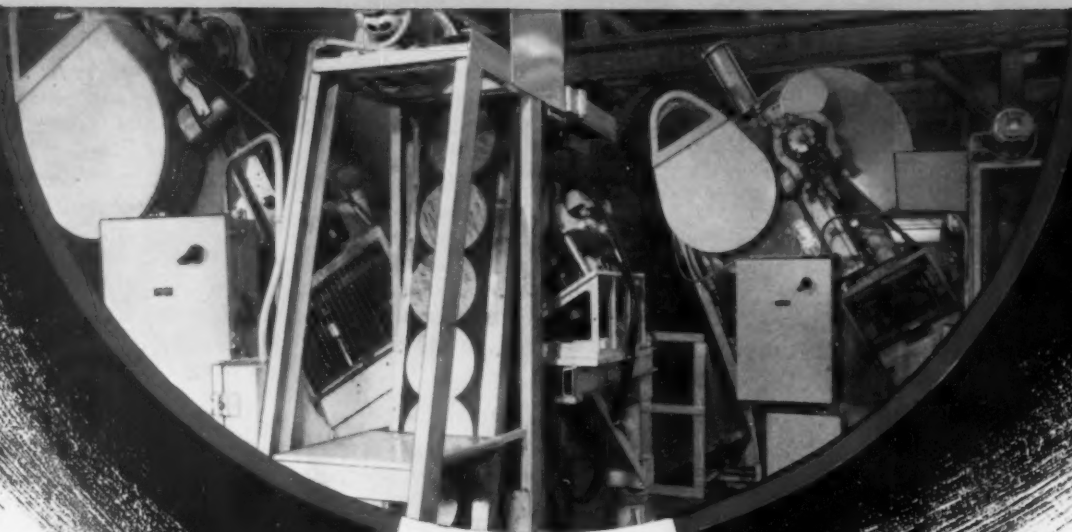
The photomicrograph on the left illustrates Weirton high carbon strip that has been spheroidized and annealed—soft and ductile—ideal for cold-forming operations. The one on the right shows the pearlitic steel structure, temper-rolled in controlled hardness and strength for clean, economical blanking procedure.



**keyhole view of key operations in . . . .**



## **4 NIAGARA AUTOMATIC OBI'S PUNCH OUT**



**(Upper)**

Two Niagara OBI's operate on each of the two G-E automated production lines at Building 85.

**(Lower)**

Fully automatic, 4 Niagara OBI's are fed by magnetized conveyor belts. Stator punchings leave press on upper conveyor and rotor punchings on lower, at rear of press. Scrap is discharged to under-floor conveyors.



Tri-Clad® '55' Motors such as this are manufactured in Building 85.



# GENERAL ELECTRIC'S "SUPER SECRET" BLDG. 85 WHICH CUT MOTOR PRODUCTION TIME FROM 2 WKS. TO 24 HRS.

Strictly "hush-hush" for its first year and a half of operation, General Electric's now widely publicized Building 85 in Schenectady gives the rest of the metalworking industry plenty of food for thought.

Chopping down production time of 7½ - 30 hp induction motors, from 2 weeks to 24 hours, is no mean feat. G.E.'s medium induction motor department has done it with the very latest ideas in mechanized fabrication.

Helping to perform the important job of punching out lamination blanks for stators and rotors are 4 fully automatic Niagara OBI Presses. Each is equipped with General Electric ACA adjustable speed drives for maintaining flexibility in the flow of parts to meet market demands for 100 standard motor models . . . the very feature that Building 85 is famous for: *Variety and Automation, too!*

Fitting perfectly into the scheme of things at this, the most modern of electric motor plants, Niagara OBI's operate on fully automatic cycles. Automatically fed by magnetized conveyor belts, they likewise discharge their work automatically to the next operation. Metal waste is removed by under-floor conveyors.

Tough assignment for an OBI? Not for a Niagara! On last report, G.E. was getting 100,000 punchings per press from each set of dies

## ROTOR AND STATOR LAMINATION BLANKS

between re-grinds. Longer die life is one of the assured benefits from the rugged, rigid, all-welded steel Niagara frames.

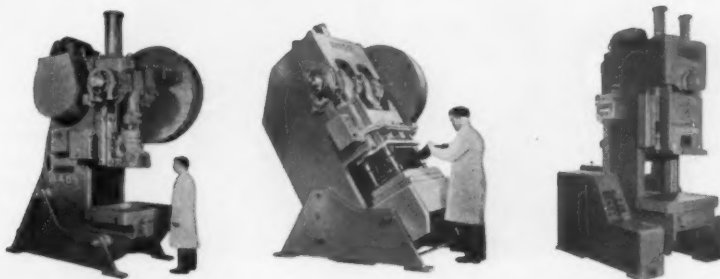
Pacemaker of the press industry, Niagara has the most to offer in OBI's . . . whether it's the Single Crank Electro-Pneumatic Clutch type used in this G-E plant, the Double Crank type for long die area work or the revolutionary new Front-to-Back Crankshaft design in automated or standard models. Now that you have the G-E story, get the whole Niagara story, too. Request literature.

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

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# NIAGARA OBI PRESSES



# look at these advantages of **IRIDITE** FINISHES

## for CORROSION-RESISTANCE, PAINT BASE on ALUMINUM and MAGNESIUM

### TYPICAL APPLICATIONS



Aircraft and Missile Parts



Automobile Hardware



Outdoor Furniture



Communications Equipment



Marine Equipment



**EASE OF USE**—Iridite is a simple chromate conversion treatment. Fast, easy, economical. You just dip, brush or spray it on the part at room temperature. No special equipment. No specially trained personnel.

**OUTSTANDING PERFORMANCE**—Forms a film that is an integral part of the metal itself. Can't flake, chip or peel. Takes paint firmly on initial application, and the bond lasts. Even protects areas scratched in use.

**LOWEST COST**—You have only minimum equipment cost, no special racks, high speed operation, lower overall handling costs.

**CHOICE OF APPEARANCE**—Clear coatings that retain metallic lustre to dark, maximum protection coatings. A variety of colors is available by dyeing.

### IRIDITE #14 and #14-2 (Al-Coat) for ALUMINUM

Two specially formulated finishes that give you maximum latitude in aluminum treatment. Both provide excellent corrosion protection and paint base. Iridite #14-2 is an improved product that allows greater flexibility in operation and coating thickness and produces the optimum in corrosion protection.

Either coating provides corrosion resistance superior even to complicated electrolytic treatments in a fraction of the time. These coatings also offer many other valuable characteristics: they have low electrical resistance, they aid in arc-welding, provide a good base for bonding compounds, have no effect on the dimensional stability of close-tolerance parts. Final appearances ranging from clear through yellow iridescence to full brown can be obtained. By dyeing, you can produce red, green, blue, orange or yellow finishes.

### IRIDITE #15 for MAGNESIUM

Produces a protective, paint base film with corrosion resistance at least equal to that obtained from long, high-temperature dichromate treatments in a fraction of the time and at room temperature. The appearance of the coating can be varied from light brown to dark brown and black.

### APPROVED UNDER GOVERNMENT AND INDUSTRIAL SPECIFICATIONS

**SEE FOR YOURSELF WHAT IRIDITE CAN DO . . . SEND SAMPLE PARTS FOR FREE PROCESSING.** Look at the results, test the protection, evaluate the savings. Also write for handy Reference File of the most complete data published on chromate conversion coatings. Or, for immediate information, call your Allied Field Engineer. He's listed under "Plating Supplies" in your classified phone book.

## ALLIED RESEARCH PRODUCTS INCORPORATED

4004-06 E. MONUMENT STREET • BALTIMORE 5, MD

Manufacturers of Iridite Finishes for Corrosion Protection  
and Paint Systems on Non-Ferrous Metals; ARP Plating Chemicals.

West Coast Licensee—L. H. Butcher Co.



## NEW EQUIPMENT

### Shaft knurling machine

Long-time manufacturer of knurling machines for various specialized operations recently introduced a shaft knurling machine for use in installing the spline type knurl on small electric motor shafts. It will produce a knurl up to three in.



long on shafts up to 20 in. long, and up to 5/8 in. in diam. Shafts are hand fed down a magazine, and automatically roll out into a receiving tray after being knurled. Rate of production is approximately 3000 shafts per hr. *Morley Mach. Corp.*

For more data circle No. 34 on postcard, p. 81

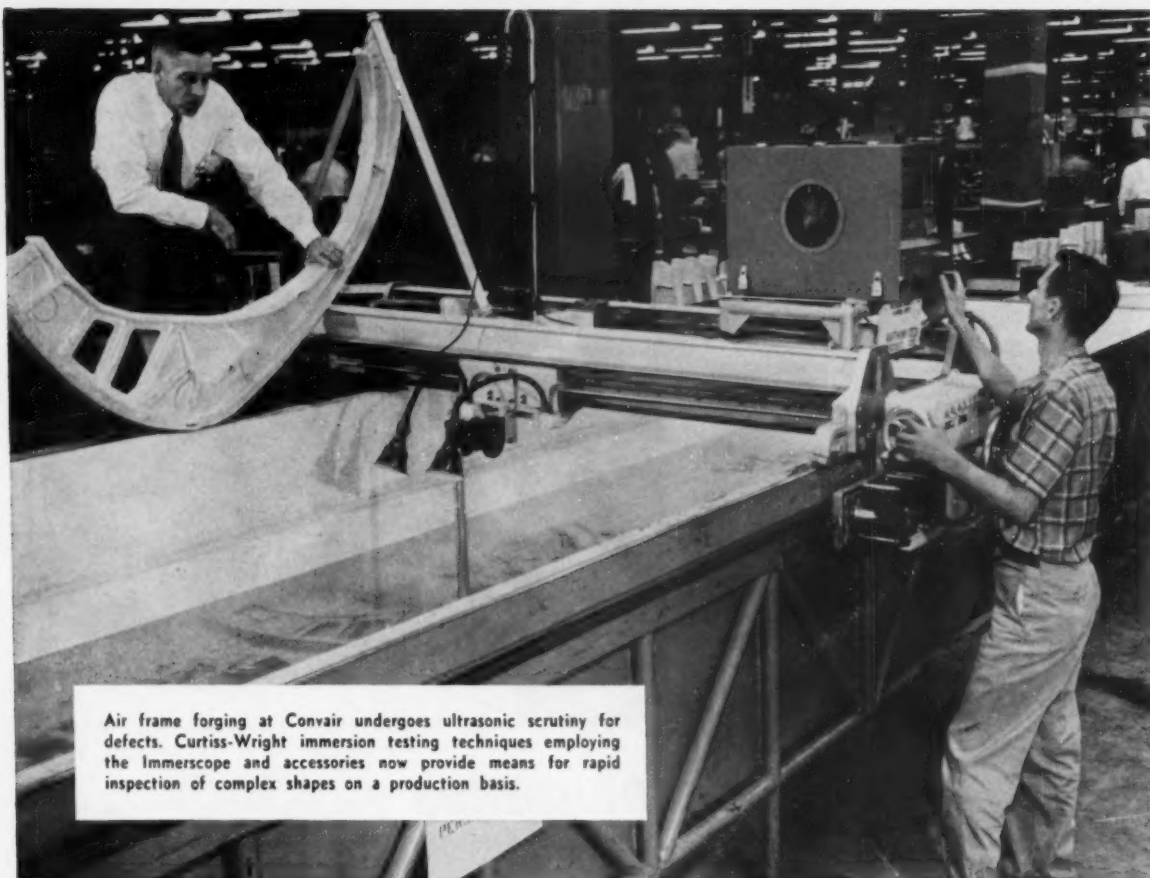
### Motorized reducer line

Combining the advantages of integral motor-reducer units with the versatility of separately mounted motors, this new line of motorized reducers has been announced. Reducers are equipped with a specially designed motor support bracket—



the reducer base supports both reducer and motor for easy set-up and shaft alignment. Motor mounting bracket slots are standardized to suit all N.E.M.A. motors. *Foote Bros. Gear & Mach. Corp.*

For more data circle No. 35 on postcard, p. 81



Air frame forging at Convair undergoes ultrasonic scrutiny for defects. Curtiss-Wright immersion testing techniques employing the Immerscope and accessories now provide means for rapid inspection of complex shapes on a production basis.

## Curtiss-Wright ULTRASONIC IMMERSCOPE Gives **CONVAIR** Forgings Final Exam for Quality



**New Curtiss-Wright Immerscope (Model 424-A)** protects quality of forgings, rolled plate, welded tubing, extrusions and other metal products. Complete with controls for gate width and depth, alarm trigger, and sensitivity time control. 400 w, 110-120 v, 60 cycle. 16"x15"x21½". Operates at 2.25, 5, 10, 15 and 25 megacycles.

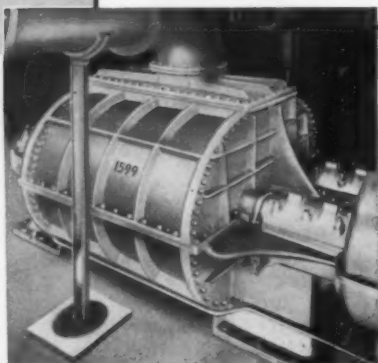
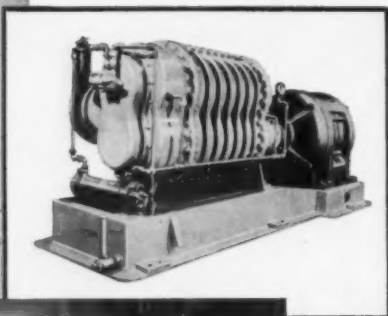
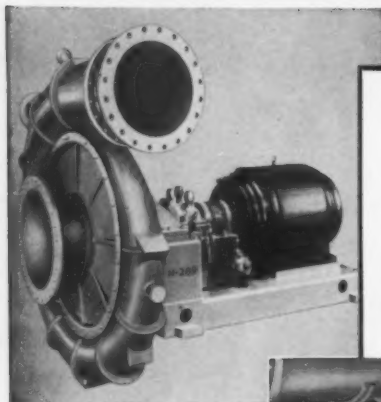
Metal parts used by the aircraft industry are subjected to quality tests at all stages, from raw material to finished components. To insure *final* quality control at Convair-Fort Worth\*, the Curtiss-Wright Ultrasonic Immerscope quickly detects flaws and discontinuities.

This ultrasonic detective "sees" through every square inch of the metal, with electrically induced sound vibrations up to several million cycles per second, revealing flaws as visible "pips" on a cathode ray tube.

The method is sure, fast and low in cost. Curtiss-Wright can engineer and custom-build production testing installations to your exact specifications. Write Industrial and Scientific Products Division, Curtiss-Wright Corporation, P. O. Box 270, Caldwell, N. J.

\*Convair-Fort Worth, A Division of General Dynamics Corporation.





- Above: R-C Centrifugal Exhausters, in capacities up to 100,000 cfm.
- Upper right: R-C Spiraxial Compressors, from 700 cfm to 5,000 cfm.
- Right: R-C Rotary Positive Blowers, sized from 5 cfm to 50,000 cfm.

## R-C *plur-ability* PAYS DIVIDENDS WHEN MOVING AIR OR GAS

Where quantity and quality of production depend upon the reliable, economical performance of blowers, exhausters and related equipment, look to the values of R-C *plur-ability*.

- choice of centrifugal, rotary positive and Spiraxial® types, an exclusive advantage of Roots-Connorsville.
- accurate control of volume and pressure.
- ample choice of capacities, from 5 cfm to 100,000 cfm.
- high efficiencies and low operating costs.
- low down-time and maintenance expense.
- long-time durability.

All these factors add up to R-C *plur-ability*. They work for you in machines which you buy for your own use, or for resale with your equipment, where handling gas or air at moderate pressures is required. Our engineering experience and ability are at your service.

### You'll find R-C *plur-ability* in all these products

Centrifugal and Rotary  
Positive Blowers, Gas  
Pumps and Exhausters

• • •

Spiraxial® Compressors

• • •

Positive Displacement  
Vacuum Pumps  
and Meters

• • •

Inert Gas Generators

• • •

Whether you use or sell  
equipment using gas or  
air at moderate pressures,  
check R-C *plur-ability*.



# ROOTS-CONNERSVILLE BLOWER



A DIVISION OF DRESSER INDUSTRIES, INC.

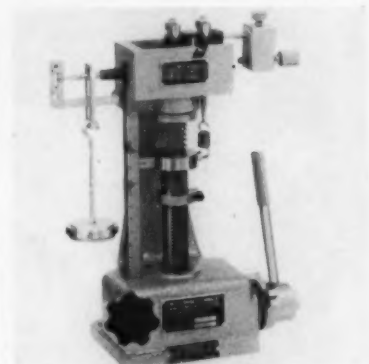
1155 Ohio Avenue, Connorsville, Indiana.

In Canada — 629 Adelaide St. W., Toronto, Ont.

## NEW EQUIPMENT

### Small spring tester

Testing small compression and extension springs for loads and deflections is said to be done with extreme accuracy on this new precision instrument. It is used for both general purpose and high quantity production testing. The capacity is 1/8 oz to 25 lb, spring



lengths zero to 5 in., spring diameters zero to 1 3/4 in., with a guaranteed accuracy within 1/4 of one pct thereby meeting the requirements of the National Bureau of Standards. Automatic production stops are adjustable for rapid production testing at speeds up to 800 tests per hr. *The Carlson Co.*

For more data circle No. 36 on postcard, p. 81

### Corrosion resistant hood

This corrosion resistant fume hood, 12 1/2 ft long, is easily lifted by two men. Described as stronger and far more rigid than a hood of metal several times this weight of 178 lb, this polyester reinforced glass



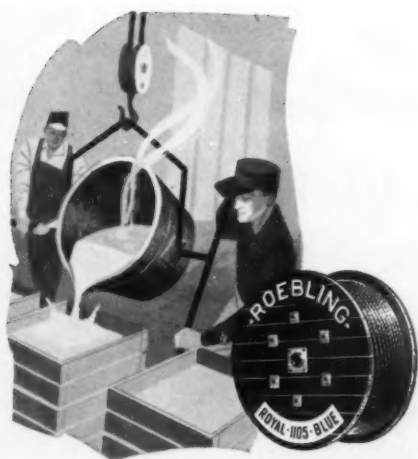
hood is also claimed to provide far greater corrosion resistance. It is used to handle strong acid fumes from electrolytic plating. This is one of several polyester glass ducts recently introduced by the company. *Haveg Corp.*

For more data circle No. 37 on postcard, p. 81



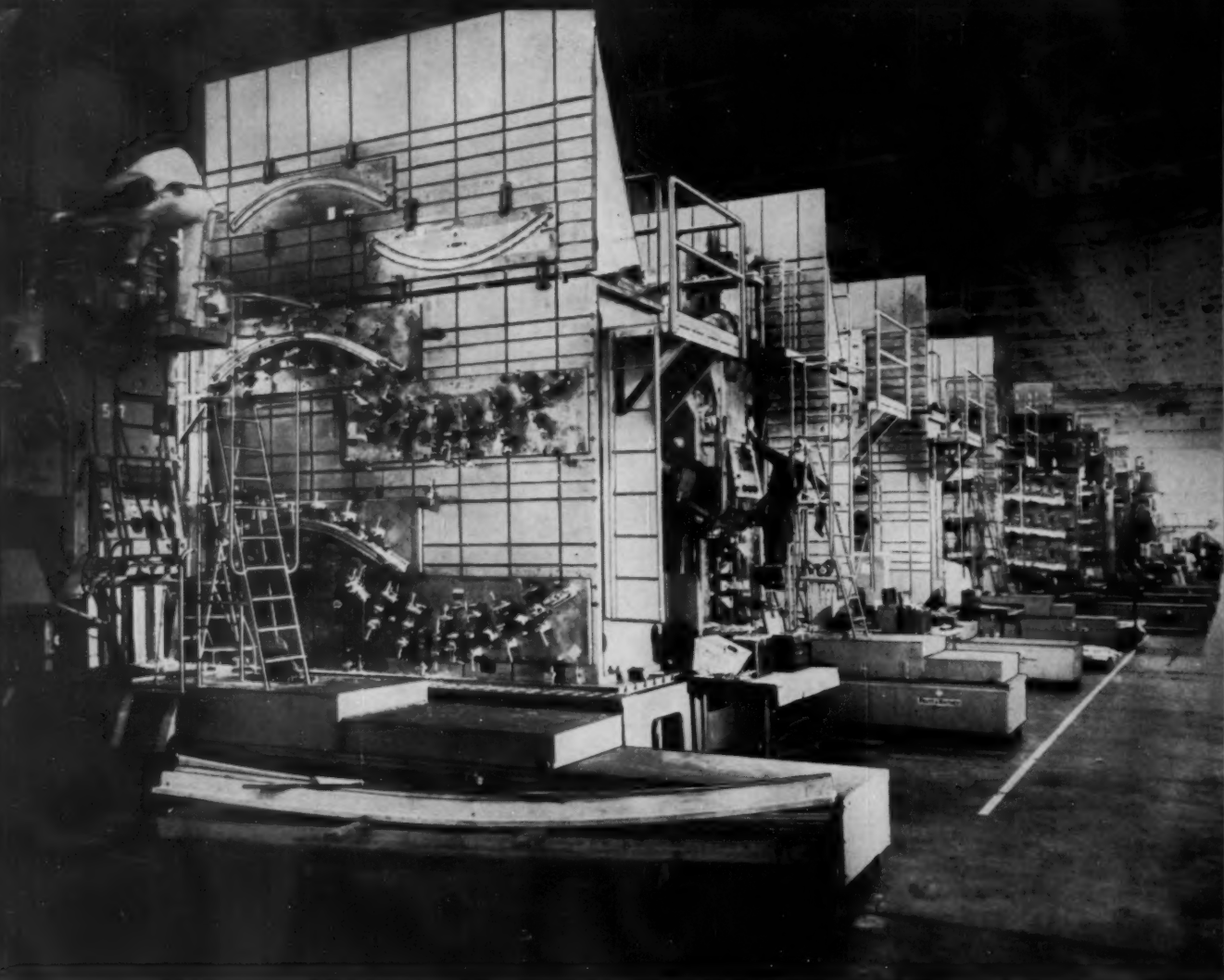
*faster*

Royal Blue  
has won acceptance *faster*  
than any other wire rope  
in Roebling history



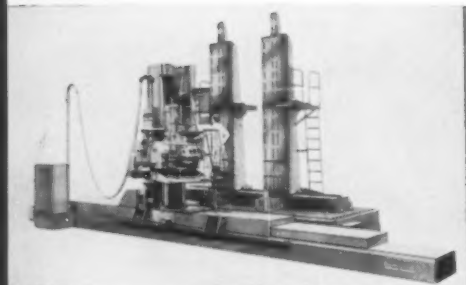
John A. Roebling's Sons Corporation, Trenton 2, N. J., Subsidiary of The Colorado Fuel and Iron Corporation BRANCHES: ATLANTA, 924 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 2340 GLENDALE-MILFORD RD., EVENDALE • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6316 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODessa, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • PITTSBURGH, 1723 HENRY W. OLIVER BLDG. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6.





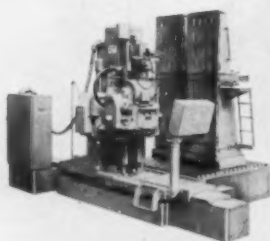
# GIANT

shape the future

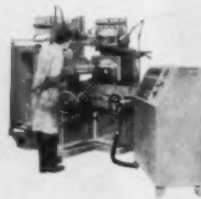


**MULTI-MILLION DOLLAR PLANT... OR SMALL SHOP**—There's a complete line of Pratt & Whitney KELLER Machines with models to handle *every* work size profitably.

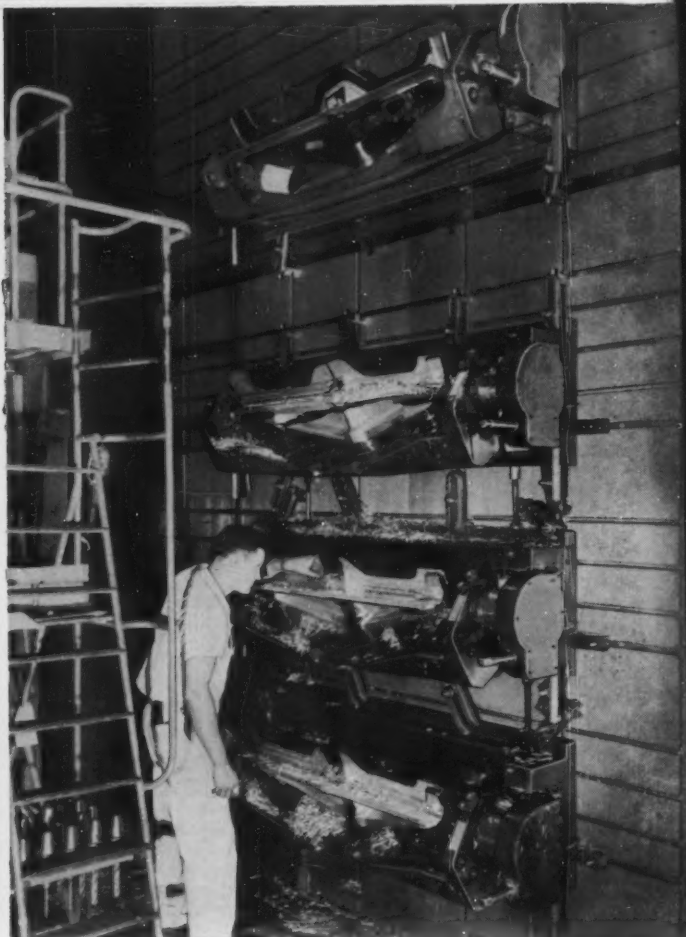
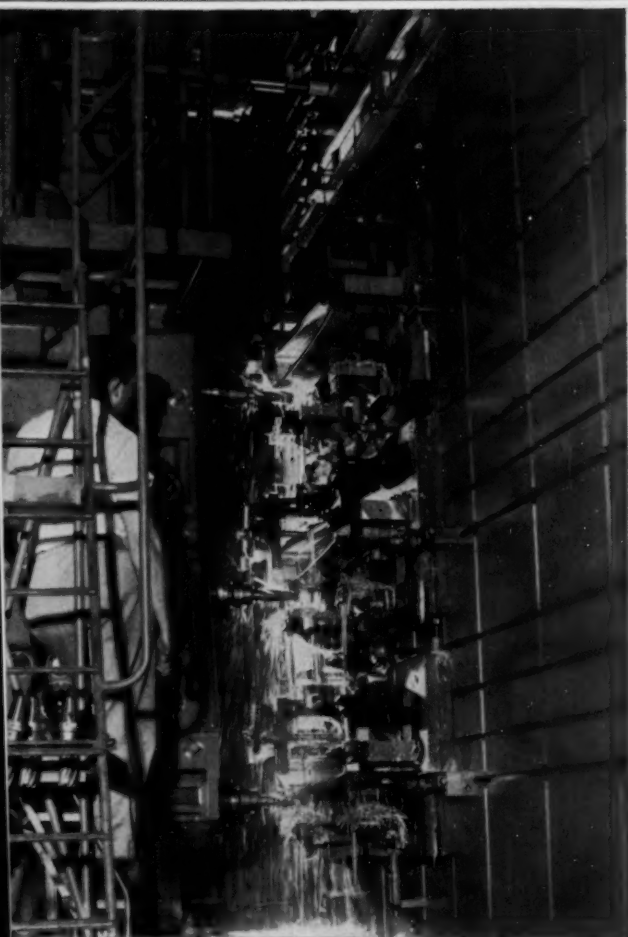
**TYPE BG-22**—A big machine with capacities to 20' x 7". Single and 3-spindle models.



**TYPE BG-21**—Two standard sizes: 5' x 2½" and 6' x 4". Single and 2-spindle models.



**TYPE BL**—Smallest KELLER with capacity of 36" x 20". Single and 3-spindle models.



The use of two and three-spindle KELLERS provides rapid output geared to tight schedules. One noted manufacturer is counting heavily on KELLERS to help produce 150-foot airliner wings on a five-a-month basis and fill \$90 million worth of orders.

Augmenting the already great versatility and productivity

built into all KELLER Machines, Tool Engineers have developed ingenious trunnion fixtures (like those shown in the adjacent picture) that make it possible to re-position the components quickly for several successive machining operations . . . *without* production stops to remove the work and change fixturing.

# KELLERS

## of jet age production

These on-the-job scenes taken in the plant of a leading aircraft manufacturer typify the swing to KELLER throughout the Aviation Industry. To provide the maximum strength-with-lightness necessary to withstand the terrific stresses of jet age flight, increasing numbers of large, complicated components are being forged as single units and

then machined over their entire surface. And making it possible to mill accurately all the complex, 3-dimensional shapes involved — on an efficient, production basis—are these rows of Pratt & Whitney BG-22 KELLER Tracer-Controlled Milling Machines . . . powerful, versatile giants that handle a wide variety of large workpieces.

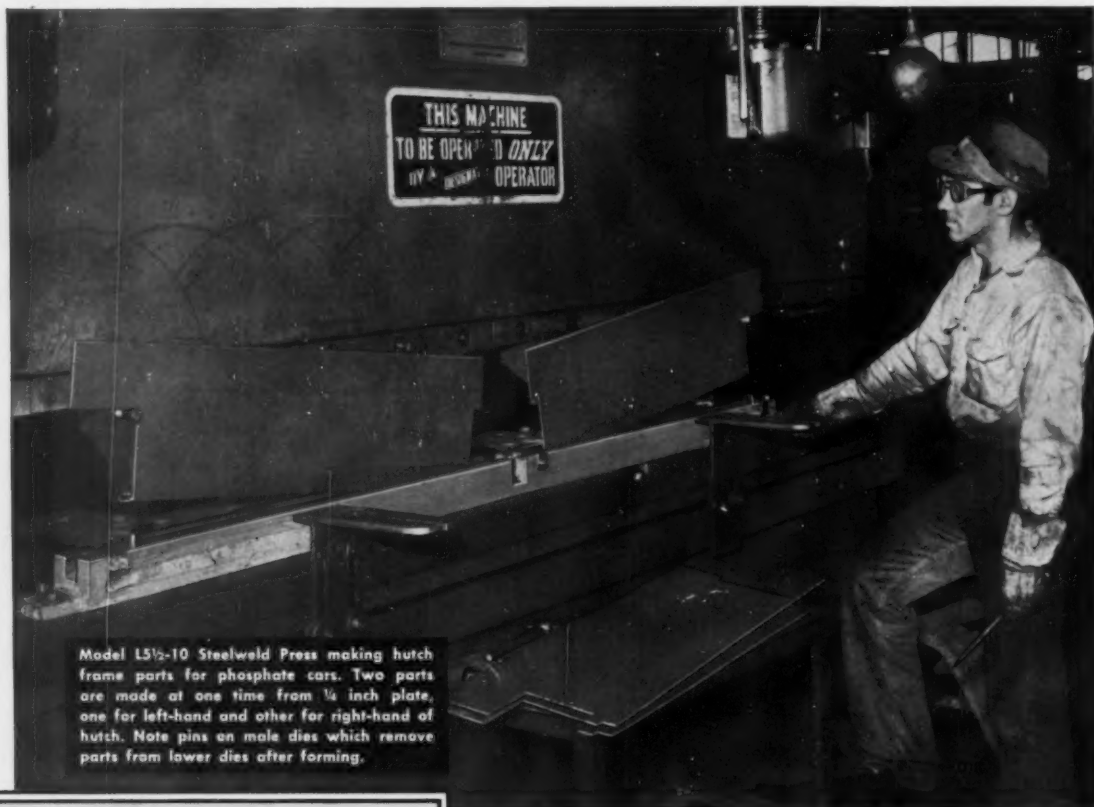
**GET THE FACTS . . .** See how PRODUCTION MILLING with a Pratt & Whitney KELLER Machine can help improve your product performance and cost picture. Write for fully illustrated circulars, stating your work size ranges . . . or phone the Pratt & Whitney Machine Tool Specialist in your area.



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MACHINE TOOLS • GAGES • CUTTING TOOLS

# PULLMAN-STANDARD FINDS MANY USES FOR STEELWELD PRESS



Model LS $\frac{1}{2}$ -10 Steelweld Press making hutch frame parts for phosphate cars. Two parts are made at one time from  $\frac{1}{4}$  inch plate, one for left-hand and other for right-hand of hutch. Note pins on male dies which remove parts from lower dies after forming.



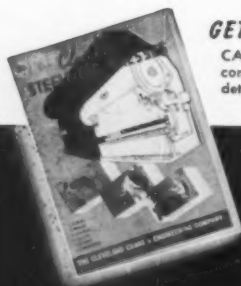
A few of the many parts produced within a short period on the Steelweld Press. Curves and bends of every shape and degree are formed quickly and accurately.

"The more we use our Steelweld Bending Press, the more we learn about what it can do for us", said the Day Superintendent of Pullman-Standard Car Mfg. Co., Butler, Penna. "As a result it is handling more and more of our work. We are doing a great many forming jobs on it that did not occur to us as being possible when we first installed the machine."

An endless variety of parts are produced on this press. These are mostly of  $\frac{1}{4}$  and  $\frac{3}{8}$  inch steel plate and involve curves and bends of every description for gussets, fulcrums, braces, frames, housings, etc. used in the manufacture of railroad cars.

The dies used are relatively simple and made in the company's shop. Because dies are easily changed, it usually takes about an hour to set up for a new job.

If you work with metal plate in any thickness up to one inch, for bending, forming or punching, you should get the facts on the many features of Steelweld Presses.



## GET THIS BOOK!

CATALOG No. 2010 gives construction and engineering details. Profusely illustrated.

## THE CLEVELAND CRANE & ENGINEERING CO.

4830 EAST 281st STREET, WICKLIFFE, OHIO

# STEELWELD BENDING PRESSES

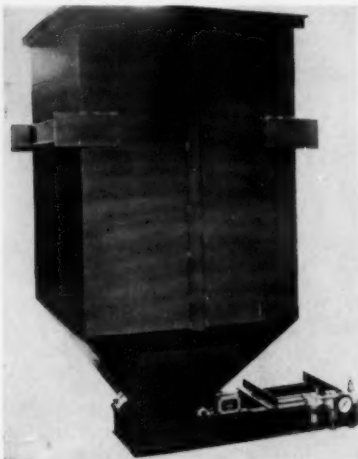
BRACING • FORMING • BLANKING • DRAWING • CORRUGATING • PUNCHING



## NEW EQUIPMENT

### Suspension hopper scale

Cumulative weighing from either a series of feeders or a single hopper is possible with a new, automatic suspension-type hopper scale. It can be used for batch weighing of most materials, with a suitable feeding arrangement. Scale is available with either air-operated discharge gates



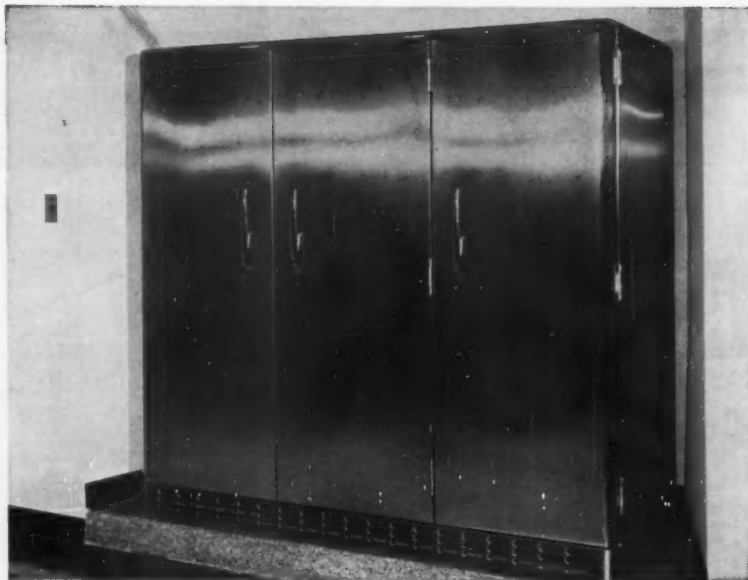
or a manually-operated handwheel. Dial head can be equipped with magnetic mercury cutoff, or potentiometer cutoff. This latter cutoff mechanism is used when the scale is incorporated into an automatic proportioning system. It is available in seven different models. *Richardson Scale Co.*

For more data circle No. 38 on postcard, p. 81

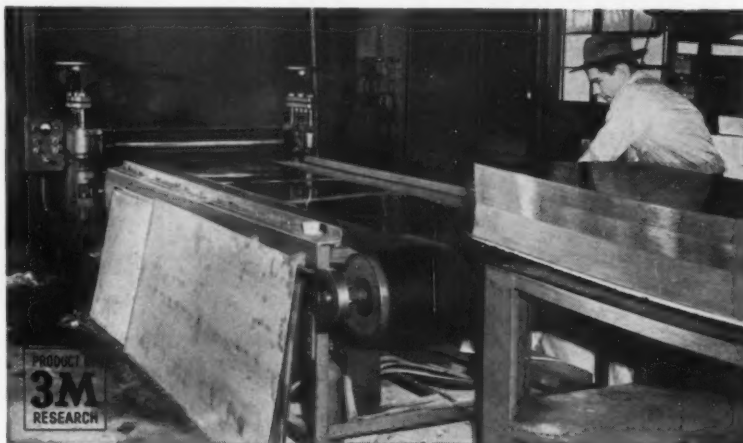
### Bench type core blowers

Providing twice the draw capacity previously available, a new extended draw bench type core blower with full four in. draw has been introduced. Horizontally-split core boxes may be handled on a fast production cycle, with the tophalf of the box attached directly to the blower magazine. One piece boxes requiring up to four in. of draw may also be handled on the same machine attached to the blower magazine. In such cases cores are blown directly onto plates and the box drawn automatically from the core. An advanced table clamp unit is available for all models for handling vertically-split boxes. It provides high speed automatic clamping. *Piper Div., Pettibone Mulliken Corp.*

For more data circle No. 39 on postcard, p. 81



**PROBLEM** Victory Metal Mfg. Corp., maker of commercial refrigerators, uses coated abrasive belts to surface-polish 18-8 stainless steel sheet stock from its standard 2B mill finish to a #4 finish. With Brand "X" Belts, costs per polished sheet were high.



**ANSWER** A 3M Representative suggested that this Plymouth Meeting, Pa., firm switch to 3M Abrasive Belts — Grit #80 Three-M-ite Cloth for rough grinding, Grit #150 Tri-M-ite Resinite Cloth for polishing. Cost per sheet for polishing operations immediately dropped substantially, with superior finishes!

Your 3M Representative can help you cut costs and increase production, too. Call him today. Or write Minnesota Mining and Manufacturing Co., Dept. DD-76, St. Paul 6, Minn., for FREE booklet: "Case History Reports on 3M Abrasive Belts".



Made in U.S.A. by Minnesota Mining and Mfg. Co. General Offices: St. Paul 6, Minn. In Canada: P.O. Box 757, London, Ontario. Export Sales Office: 99 Park Avenue, New York City. Makers of "Scotch" Brand Pressure-Sensitive Tapes, "Scotch" Brand Magnetic Tape, "3M" Adhesives, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip surfacing.

**Designed to do a better job**



**Ruthman Gusher Coolant Pumps**

The simple designs and sturdy construction of Ruthman Gusher Pumps assure you long trouble-free life and efficient operation. There are fewer parts to wear, pre-lubricated heavy-duty ball bearings require no further lubrication — electronically balanced rotating assembly cuts vibration to minimum. So be sure to specify the pumps that are designed to do a better job . . . "Gusher" Pumps.

**THE RUTHMAN MACHINERY CO.**

1809-1823 READING RD.

Illustrated is a model 821-2 Microflat Machine equipped with a "Gusher" Coolant Pump—Photo courtesy of Micromatic Hone Corp.

**CINCINNATI 2, OHIO**

## NEW EQUIPMENT

### Condenser cleaning tube

A super-jet tool that provides extremely fast and effective cleaning of condenser tubes is now available. It utilizes a handy gun-and-slug method to thoroughly remove slime and scale at a considerable time savings over ordinary mechanical methods. One man can quickly load



an entire bank with cleaning slugs and shoot them through in rapid succession. Gun is a lightweight rugged duty tool, weighing only 2 3/4 lb. It can be operated by either air or water pressure. Effective pressures range from 50 to 200 psi. Crane Packing Co.

For more data circle No. 40 on postcard, p. 81

## Perforations perplexing you?

MASONITE? PLASTIC? METALS? RUBBER?



If you have a design problem that's got you down maybe Hendrick can be of help. Sometimes the easiest and quickest way to enhance a product's beauty is to include a pleasing pattern of perforations in its design. Hendrick perforated metal not only helps increase a product's overall attractiveness, but also adds to its saleability as well. And whatever material you're using . . . whether it's metal, masonite, rubber, plastic, hard or insulated board for decorative display or fabricating purposes you can draw on Hendrick's long experience and perforating facilities to fill the bill. Write for details.

**...better call HENDRICK**

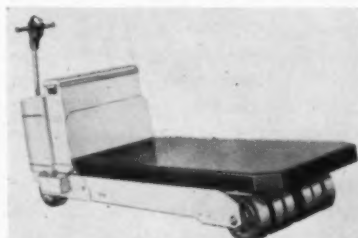
**Hendrick**  
MANUFACTURING COMPANY

37 DUNDAFF ST., CARBONDALE, PA. • Sales Offices in Principal Cities  
Perforated Metal • Perforated Metal Screens • Wedge-Slot and Wedge Wire  
Architectural Grilles • Mitco Open Steel Flooring • Shur-Site Treads • Armorgriids



### Hydroelectric lift truck

Lift truck manufacturer has expanded its heavy duty platform trucks making available to heavy industry the hand motorized truck in capacities up to 20,000 lb. The Hydroelectric up to and including 14,000 lb capacity is driven by a completely enclosed drive unit. In capacities of 16 to 20,000 lb twin



dual drives are used. Platform widths of 27 in. minimum, and lengths of 48 in. and up are available in lowered heights of 9, 10, 11 in. The extra heavy duty Hydroelectric now makes it possible for heavy industry to handle dies and like loads with hand motorized lift trucks. *Lift-Trucks, Inc.*

For more data circle No. 41 on postcard, p. 81

### Press brake

Seven different angles in succession are formed without resetting the controls with this new hydraulic press brake. All bends on a piece of metal are formed in one handling by presetting the controls just once. Range is described as being from 12 in. deep bends formed in a single stroke to bends of less than  $\frac{1}{8}$  in. with press cycling at 50 strokes per minute or more. It is said to be accurate to within thousands of an in. Work



can be done at any point along the entire length of the bed. The piece can be passed progressively from die to die for blanking, deep drawing, embossing, punching and forming, according to the maker. Used also for straightening, the machine will do rubber pad forming, pipe making, stretching, extruding. *Pacific Industrial Mfg. Co.*

For more data circle No. 42 on postcard, p. 81

### Sub-zero cabinets

Sub-zero temperature cabinets with two cu ft capacity with front or top opening for testing of electronic components, cold treatment of metals, thermal contraction and expansion fitting are now available. Temperature range from ambient (110°F) to -140°F. Voltage is 115 or 230, single phase, 60 cycle. Temperature control is visible and adjustable with a temperature range from plus 150°F to minus 150°F. Temperature control accuracy is plus or minus one degree. *Webber Engineering Corp.*

For more data circle No. 43 on postcard, p. 81

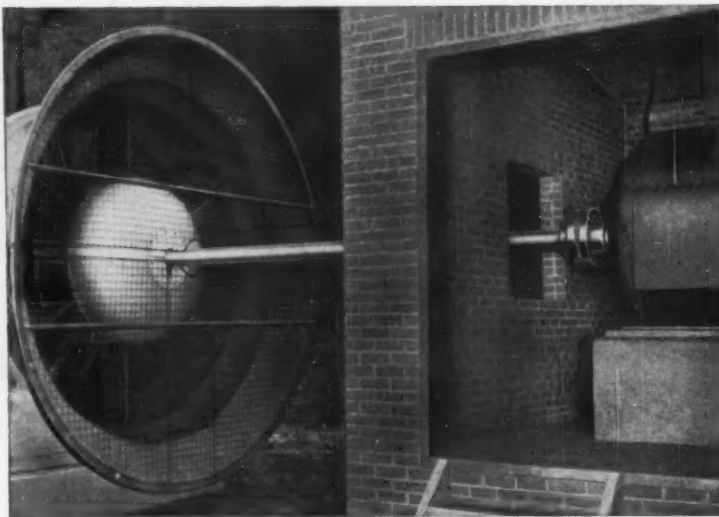
### Miniature thermocouples offer rapid response

Manufacturer has announced a recent advance in design of its miniature bayonet thermocouples. These include a wider variety of immersion lengths, adapters, lead wires and terminals. The extreme sensitivity of these thermocouples is said to provide rapid response to temperature change. These imbedded, bayonet-lock units have spring-loaded hot junctions and are

easily removable, requiring just a simple twist and pull. They are calibrated in Copper-Constantan, Iron-Constantan and Chromel-Alumel with three temperature ranges between -300° and +1400°F. Construction is entirely of stainless steel except for the heat resistant compression spring. *Thermo Electric Co., Inc.*

For more data circle No. 44 on postcard, p. 81

## Eliminate Intermediate Bearings!



By using Thomas Flexible Couplings on long, unsupported shafts, intermediate bearings are eliminated. Thomas engineers tubular shafts free from lateral whip.

The large fan shown above is 16' from the motor to allow sufficient air intake. Miners working underground receive their fresh air supply from this fan and others like it,

which have been giving dependable service for as long as fifteen years... without shutdowns for lubrication or maintenance of the couplings.

Thomas floating shaft flexible couplings are recommended for machine and marine drives, printing presses, paper and cement mills, cooling towers, diesel engines, pumps, compressors, and many other uses.

### Only Thomas Flexible Couplings offer all these advantages

#### UNDER LOAD and MISALIGNMENT

- |                                 |                                   |
|---------------------------------|-----------------------------------|
| 1. Freedom from Backlash—       | Constant Rotational Velocity      |
| Torsional Rigidity              | 4. Visual Inspection in Operation |
| 2. Free End Float               | 5. Original Balance for Life      |
| 3. Smooth Continuous Drive with | ... and                           |

**THOMAS ALL METAL COUPLINGS HAVE NO WEARING PARTS  
SO LUBRICATION AND MAINTENANCE ARE ELIMINATED**

Write for Engineering Catalog 51A

**THOMAS FLEXIBLE COUPLING COMPANY**

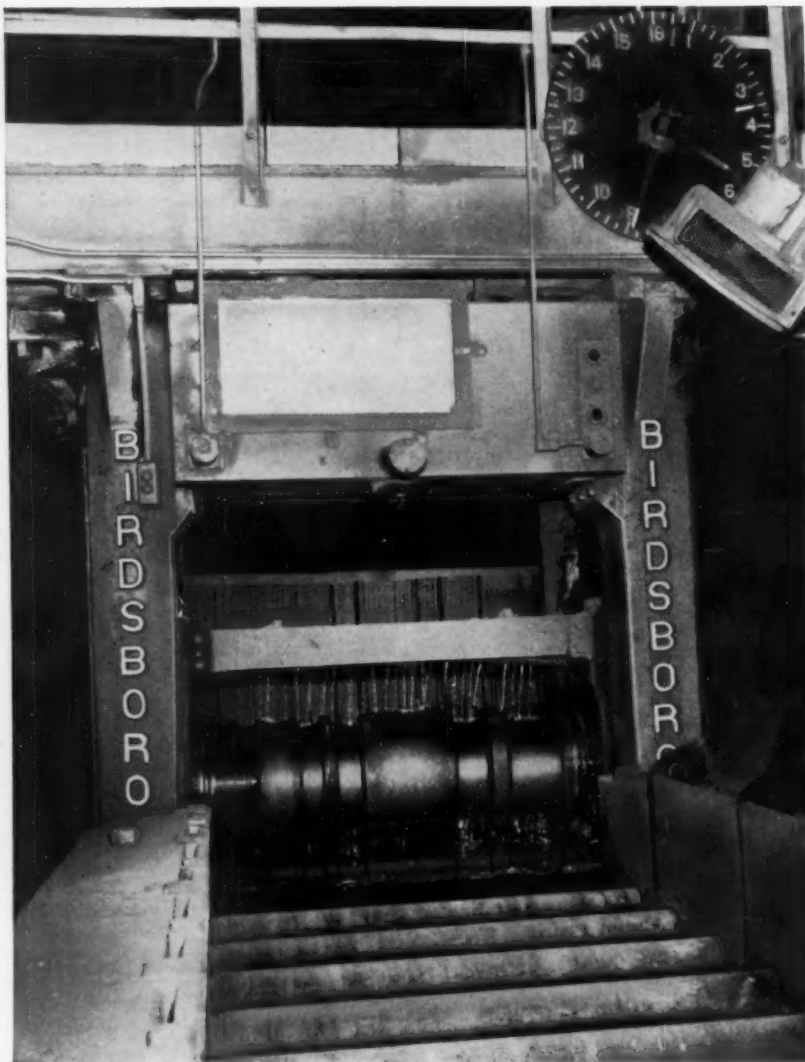
WARREN, PENNSYLVANIA, U.S.A.

# Steel industry will add 60 million tons capacity at a cost of \$17½ billions

## With Expansion Plans On Paper, Steelmen Seek Ways to Cut Production Costs

By 1970, authoritative forecasts indicate that the steel industry will add another 60 million tons capacity to satisfy demand. Many producers are already "expansioneering" to new tonnage highs. Others have plans in the works. But the immediate question for steelmen is: how to produce *extra* tonnage while holding costs in line.

That's exactly why more and more plants are writing BIRDSBORO Rolls into specifications for new and larger mills. Why not let a roll specialist from BIRDSBORO explain the advantages you can get through individualized roll service.



DESIGNERS  
AND BUILDERS  
OF:

STEEL MILL MACHINERY  
HYDRAULIC PRESSES  
(Metalworking and Extrusion)

CRUSHING MACHINERY

SPECIAL MACHINERY

STEEL CASTINGS

Weldments "CAST-WELD" Design

ROLLS: Steel, Alloy Iron, Alloy Steel

IRON BASE ROLLS: Grainloy, Birdsboro Metal, Curoloy, Superloy, Super Curoloy

STEEL BASE ROLLS: Diamondite, Birdsboro Special, Birdsboro "30", "40", "50", and "75"

# BIRDSBORO

BIRDSBORO STEEL FOUNDRY & MACHINE CO., Main Offices in Birdsboro, Pa. District Office: Pittsburgh, Pa.

New York Office: Engineering Supervision Co., 120 West 42nd Street, New York 36, N.Y.



## The Iron Age SUMMARY...

**Steel strike negotiators will wind up in Washington if no settlement this week . . . Pressure from government and industry growing . . . Pinch on industry becoming more serious.**

**Tiger By Tail . . .** Both sides in the steel labor hassle have a tiger by the tail. If the strike is not settled this week, negotiators will be called to Washington, where Government pressure, already strong, will be intensified.

Neither side wants that to happen. That's why negotiations were resumed Tuesday, only three days after an apparently-hopeless deadlock. Both parties are expected to move off dead center in a last-ditch effort to effect a settlement.

But it will take a lot of compromising to end the strike. The steel companies and steel labor are still far apart—perhaps as much as 11 to 12 cents on money and even more on principle.

The pressure from Government and industry is hard to ignore. The Administration does not relish the thought of a long steel strike in an election year. And the pinch on industry is growing more serious by the day.

**Losses Heavy . . .** As of now, probably 30 pct of steel's customers are in serious trouble. A settlement this week would not be of much help to these consumers since steel supply pipelines will be slow to fill after production is resumed.

With the walkout in its fourth week and production losses certain to hit nine million ingot

tons, effect on industry will be felt as far away as December, or early 1957. Among those that will be short of steel by October or November are tinplate users, construction steel fabricators, wire and wire product customers and warehouses, and auto and auto parts makers.

Each day of the strike compounds the start-up problems of the mills. Not to mention the matter of which customers get priority once shipments are resumed. It will take no less than two weeks, and probably three weeks before steel production and supply lines are back to normal once the walkout ends.

**Holding On . . .** That's why realistic steel customers began to husband their inventories as early as two weeks after the strike began. Some users have cut back on their operations. Others are getting what they can from warehouses and gray market operators. Foreign mills are having a heyday, particularly in the South, where an earlier strike at Tennessee Coal & Iron Div. of U. S. Steel had reduced inventories to the vanishing point.

Steel scrap prices continued to advance this week, apparently in anticipation of an expected run on available supplies once the strike ends.

### Steel Output, Operating Rates

	This Week	Last Week	Month Ago	Year Ago
<b>Production</b>				
(Net tons, 000 omitted)	406	369	2,386	2,207
<b>Ingot Index</b>				
(1947-1949=100)	25.2	22.9	148.8	137.0
<b>Operating Rates</b>				
Chicago	6.0	6.0	95.0	96.5
Pittsburgh	7.0	6.0	98.0	97.0
Philadelphia	0.0	0.0	107.0	94.0
Valley	13.0	13.0	96.0	92.0
West	25.0	24.0*	103.0	96.0
Detroit	55.0	52.0*	100.0	89.0
Buffalo	0.0	0.0	105.0	105.0
Cleveland	0.0	0.0	103.0	96.0
Birmingham	3.5	3.5	23.5	94.0
S. Ohio River	72.0	73.0*	90.0	79.5
Wheeling	55.0	55.5	95.0	95.0
St. Louis	95.0	84.0	95.0	88.0
Northeast	47.0	47.0	85.0	86.0
<b>Aggregate</b>	16.5	15.0	97.0	91.5

\*Revised

### Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
<b>Composite price</b>				
Finished Steel, base	5.179	5.179	5.179	5.174
Pig Iron (Gross Ton)	\$61.36	\$60.61	\$60.29	\$59.09
Scrap, No. 1 hvy (gross ton)	\$49.50	\$46.50	\$44.83	\$41.50
<b>Nonferrous</b>				
Aluminum ingot	25.90	25.90	25.90	23.20
Copper, electrolytic	46.00	46.00	46.00	36.00
Lead, St. Louis	15.80	15.80	15.80	14.80
Magnesium	34.50	34.50	34.50	29.25
Nickel, electrolytic	64.50	64.50	64.50	67.67
Tin, Straits, N. Y.	95.75	96.125	95.00	98.25
Zinc, E. St. Louis	13.50	13.50	13.50	12.50

## Inventories Are Melting

**Pinch is beginning to be felt by users . . . Fabricators in some cases are substituting, using imported steel and are cutting work weeks . . . Government modifies distributor freeze.**

◆ **INVENTORY FAT** is beginning to melt this week, but it's still keeping some metal users on their feet.

The real pinch is expected to come when secondary processors begin to exhaust their stocks. Meanwhile, through substituting available items for those unobtainable, by using imported steel, and by digging into pre-strike stores, fabricators are still operating.

It's touch-and-go however. One manufacturer averted a major shutdown only by acquiring an emergency supply. Plate consumers are cutting their work week to four days to stretch out inventory.

Items getting in the "tight" supply category include bar, strip, gal-

vanized sheet, structurals and plate.

The partial thaw of the government's freeze on deliveries of certain steel products was also an aid.

These restrictions on distributors filling non-defense orders were modified on July 20 by the Business and Defense Services Administration.

The new Direction 8, superseding temporary Direction 7 of July 6, contains a schedule establishing limitations on weekly shipments by distributors for non-defense orders, but applicable only when the distributor's supply of any specified steel is reduced to 50 pct of his June 30, 1956 inventory of that

steel. Until the distributor's inventory reaches that point, there will be no limitation on warehouse sale of steel products, BDSA says. The provisions of Direction 8 apply to distributors' shipments beginning with the week of July 22, picking up where Direction 7 leaves off.

To protect orders of defense contractors, the new Direction prohibits shipments against unrated orders of all types of aircraft quality steel, nickel-bearing steel plate over 72 inches wide, or any nickel-bearing stainless steel plate over one-half inch thick.

Price increases reported by operating companies this week were as follows:

Greer Steel Co., Dover, O., raised cold-rolled strip and electro-galvanized steel \$12.00 a ton. New Greer prices, effective July 16, for these and other products, in dollars per 100 lb, were: cold-rolled strip—\$6.85, cold-rolled electro-galvanized, \$6.85, cold-rolled flat wire—\$10.25, cold-rolled alloy strip, \$13.45, and cold-rolled Cor-Ten—\$9.30. Other increases at Greer, covering cold-rolled spring steel, are: carbon .26 to .40—\$7.10, carbon .41 to .60—\$9.05, carbon .61 to .80—\$10.60, carbon .81 to 1.05—\$12.75, and carbon 1.06 to 1.35—\$15.45.

Acme Steel Co., Chicago, raised hot-rolled strip, sheets, and plates \$3.50 a ton and cold-rolled strip steel (Carbon .25% max.), \$12.00 a ton.

New Acme prices, in dollars per 100 lb, are: hot-rolled strip, \$4.725, hot-rolled sheets, \$4.725, hot-rolled plates, \$4.90 and cold-rolled strip (Carbon .25% max.), \$6.95.

Jones & Laughlin Steel Corp's Container Div. announced a 5 pct increase in the price of steel drums effective July 23.

Pig iron prices were advanced \$2.50 a ton this week by Interlake Iron Corp., Alan Wood Steel Co., Wisconsin Steel Co. and Granite City Steel Co. Other producers also raised pig iron the same amount.

**FABRICATING . . .** Arrival of thousands of tons of foreign steel is keeping fabricating plants in the Birmingham district operating on a limited basis and has averted a cut in production of others.

## Beyond the Mid-way Mark . . .

When the warehouse distributor's inventory reaches the 50 percent point, his weekly shipments to a single customer against non-defense orders under the government's directive may be made as follows:

Category	Lb
<b>Carbon steel</b>	
1. Bar, bar shapes, except reinforcing (hot rolled)	4000
2. Plate (except floor plate, abrasion resistant plate, and plate less than one-half inch thick)	200
3. Pipe, tubing	4000
<b>Nickel-bearing alloy steel (except stainless steel)</b>	
4. Bar, bar shapes (hot rolled)	2000
5. Sheet, strip	2000
6. Plate	2000
7. Pipe, tubing	2000
<b>Non-nickel-bearing alloy steel (except stainless)</b>	
8. Bar, shapes (hot rolled)	4000
9. Sheet, strip	4000
10. Plate	2000
11. Pipe, tubing	4000
<b>Nickel-bearing stainless steel</b>	
12. Bar, bar shapes (hot rolled)	1000
13. Sheet, strip	1000
14. Plate	1000
15. Pipe	1000

Exemptions to the foregoing limitations will be made in cases where shipment would consist of a single mill piece exceeding the listed weight, such as a section of carbon plate for example, weighing 3,000 pounds.

# Comparison of Prices

(Effective July 24, 1956)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	July 24 1956	July 17 1956	June 26 1956	July 26 1955
<b>Flat-Rolled Steel: (per pound)</b>				
Hot-rolled sheets	4.325¢	4.325¢	4.325¢	4.325¢
Cold-rolled sheets	5.325	5.325	5.325	5.325
Galvanized sheets (10 ga.)	5.85	5.85	5.85	5.85
Hot-rolled strip	4.325	4.325	4.325	4.325
Cold-rolled strip	6.25	6.25	6.25	6.25
Plate	4.52	4.52	4.52	4.52
Plates, wrought iron	10.40	10.40	10.40	9.30
Stainl's C-R strip (No. 302)	44.50	44.50	44.50	44.50
<b>Tim and Terneplate: (per base box)</b>				
Tinplate (1.50 lb.) cokes	\$9.85	\$9.85	\$9.85	\$9.85
Tinplates, electro (0.50 lb.)	8.55	8.55	8.55	7.75
Special coated mfg. terms	9.10	9.10	9.10	7.95
<b>Bars and Shapes: (per pound)</b>				
Merchant bars	4.65¢	4.65¢	4.65¢	4.65¢
Cold finished bars	5.90	5.90	5.90	5.90
Alloy bars	5.65	5.65	5.65	5.65
Structural shapes	4.60	4.60	4.60	4.60
Stainless bars (No. 302)	38.25	38.25	38.25	38.25
Wrought iron bars	11.50	11.50	11.50	10.40
<b>Wire: (per pound)</b>				
Bright wire	6.60¢	6.60¢	6.60¢	6.25¢
<b>Rails: (per 100 lb.)</b>				
Heavy rails	\$4.725	\$4.725	\$4.725	\$4.725
Light rails	5.65	5.65	5.65	5.65
<b>Semifinish Steel: (per net ton)</b>				
Re-rolling billets	\$68.50	\$68.50	\$68.50	\$68.50
Slabs, re-rolling	68.50	68.50	68.50	68.50
Forging billets	84.50	84.50	84.50	84.50
Alloy blooms, billets, slabs	96.00	96.00	96.00	96.00
<b>Wire Rod and Skelp: (per pound)</b>				
Wire rods	5.025¢	5.025¢	5.025¢	5.025¢
Skelp	4.225	4.225	4.225	4.225
<b>Finished Steel Composite: (per pound)</b>				
Base price	5.179¢	5.179¢	5.179¢	5.174¢

**Finished Steel Composite**  
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite**  
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

**Steel Scrap Composite**  
Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

	July 24 1956	July 17 1956	June 26 1956	July 26 1955
<b>Pig Iron: (per gross ton)</b>				
Foundry, del'd Phila.	\$66.51	\$65.26	\$65.26	\$63.69
Foundry Valley	60.50	60.50	60.50	59.00
Foundry, Southern Cin'ti	62.93	62.93	62.93	62.93
Foundry, Birmingham	57.67	57.67	55.00	55.38
Foundry, Chicago	63.90	60.50	60.50	59.00
Basic del'd Philadelphia	65.73	64.48	64.48	62.77
Basic, Valley furnace	60.90	60.00	60.00	58.50
Malleable, Chicago	63.90	60.50	60.50	59.00
Malleable, Valley	60.50	60.50	60.50	59.00
Ferromanganese, cents per lb.	9.50¢	9.50¢	9.50¢	9.50¢
† 74.76 pct Mn base.				

	July 24 1956	July 17 1956	June 26 1956	July 26 1955
<b>Pig Iron Composite: (per gross ton)</b>				
Pig iron	\$60.61	\$60.61	\$60.20	\$59.09
<b>Scrap: (per gross ton)</b>				
No. 1 steel, Pittsburgh	\$50.50	\$46.50	\$44.50	\$41.50
No. 1 steel, Phila. area	51.50	48.50	46.50	42.50
No. 1 steel, Chicago	46.50	44.50	43.50	40.50
No. 1 bundles, Detroit	41.50	39.50	37.50	34.50
Low phos., Youngstown	54.50	52.50	46.50	42.50
No. 1 mach'y cast, Pittsburgh	54.50	54.50	54.50	44.50
No. 1 mach'y cast, Philadel'a	54.50	54.50	54.50	45.00
No. 1 mach'y cast, Chicago	49.50	47.50	47.50	50.50

	July 24 1956	July 17 1956	June 26 1956	July 26 1955
<b>Steel Scrap Composite: (per gross ton)</b>				
No. 1 heavy melting scrap	\$49.50	\$46.50	\$44.83	\$41.50

	July 24 1956	July 17 1956	June 26 1956	July 26 1955
<b>Coke, Connellsville: (per net ton at oven)</b>				
Furnace coke, prompt	\$14.50	\$14.50	\$14.50	\$13.25
Foundry coke, prompt	17.50	17.50	17.50	16.25

	July 24 1956	July 17 1956	June 26 1956	July 26 1955
<b>Nonferrous Metals: (cents per pound to large buyers)</b>				
Copper, electrolytic, Conn.	\$46.00	\$46.00	\$46.00	\$36.00
Copper, Lake, Conn.	46.00	46.00	46.00	36.00
Tin, Straits, New York	95.75¢	96.125	95.00	98.25
Zinc, East St. Louis	13.50	13.50	13.50	12.50
Lead, St. Louis	15.80	15.80	15.80	14.80
Aluminum, virgin ingot	25.90	25.90	25.90	23.20
Nickel, electrolytic	64.50	64.50	64.50	67.67
Magnesium, ingot	34.50	34.50	34.50	29.25
Antimony, Laredo, Tex.	33.00	33.00	33.00	28.50
† Tentative. ‡ Average. * Revised.				

## PIG IRON      Dollars per gross ton, f.o.b., subject to switching charges.      STAINLESS STEEL

←To identify producers, see Key on p. 132→

Producing Point	Basic	Fdry.	Mell.	Boaz.	Low Phos.
Beckham B3	62.00	62.50	63.00	63.50	.....
Birdsboro, Pa. B6	64.50	65.00	65.50	66.00	.....
Birmingham R3	58.50	59.00*	63.00	.....	.....
Birmingham W9	58.50	59.00*	63.00	.....	.....
Birmingham U4	58.50	59.00*	63.00	.....	.....
Buffalo R3	60.00	60.50	61.00	61.50	.....
Buffalo H1	60.00	60.50	61.00	61.50	.....
Buffalo W6	60.00	60.50	61.00	61.50	.....
Chatter C17	62.00	62.50	63.00	.....	.....
Chicago I4	62.50	63.00	63.50	64.00	.....
Cleveland A5	60.00	60.50	60.50	61.00	65.00†
Cleveland R3	60.00	60.50	60.50	61.00	.....
Duluth I4	62.50	63.00	63.00	63.50	67.50‡
Erie I4	62.50	63.00	63.00	63.50	67.50‡
Everett M6	.....	63.75	64.25	.....	.....
Fantana K1	70.00	70.50	.....	.....	.....
Geneva, Utah C7	60.00	60.50	61.00	61.50	.....
Granite City C2	64.48	64.90	65.40	.....	.....
Hubbard Y1	.....	60.50	.....	.....	.....
Loon Star L3	.....	55.00	.....	.....	.....
Midland C11	60.00	.....	.....	.....	.....
Minnequa C6	62.00	62.50	63.00	.....	.....
Monessen F6	60.00	.....	.....	.....	.....
Neville Is. P4	62.50	63.00	63.00	63.50	67.50†
N. Tonawanda T1	60.00	60.50	61.00	61.50	.....
Pittsburgh U1	60.00	60.50	60.50	61.00	.....
Shargerville S3	60.00	60.50	60.50	61.00	.....
So. Chicago R3	60.00	60.50	60.50	61.00	.....
Steelton B3	62.00	62.50	63.00	63.50	68.00
Swadland A2	64.50	65.00	65.50	66.00	.....
Toldeo I4	62.50	63.00	63.00	63.50	.....
Troy, N. Y. R3	62.00	62.50	63.00	63.50	68.00
Youngstown Y1	.....	60.50	61.00	.....	.....

**DIFFERENTIALS:** Add, 50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, \$2 per ton for 0.5 to 0.75 pct nickel, \$1 for each additional, 0.25 pct nickel \* Add \$1.00 for 0.31-0.60 pct phos. † Intermediate low phos. ‡ Silvery iron: Buffalo, H1, \$70.25; Jackson, J1, G1, \$69.00. Add \$1.25 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferroalloys prices are \$1 over comparable silvery iron.

Product	201	202	301	302	303	304	316	321	348	410	416	430
Ingot, re-rol.	18.50	19.75	19.25	20.50	—	21.75	33.00	28.50	35.25	15.00	—	15.25
Slabs, billets, re-rol.	23.00	25.50	23.75	24.25	26.75	27.50	41.75	33.50	44.50	19.50	—	19.75
Forg. dcs, die blks., rgs.	—	—	—	—	—	—	—	—	—	—	—	—
Billets, forging	—	31.00	31.75	32.00	34.75	33.75	52.75	39.75	52.50	25.50	26.00	26.00
Bar, struct.	—	34.75	36.00	36.25	41.00	40.25	62.75	47.25	62.00	30.50	31.00	31.00
Plates	—	38.75	40.00	40.25	42.75	43.00	66.00	51.25	64.75	31.75	33.00	32.25
Sheets	42.25	42.50	44.25	44.50	52.25	47.25	70.25	56.25	75.50	36.25	—	36.75
Strip, hot-rolled	31.00	32.50	32.00	34.50	—	37.25	50.75	45.75	61.25	28.00	—	28.75
Strip, cold-rolled	39.00	42.50	41.00	44.50	—	47.25	70.25	56.25	75.50	36.25	—	36.75
Wire CF, HR; Rod HR	—	—	36.00	36.25	39.00	34.25	59.75	45.00	59.00	29.00	29.50	29.50

### STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; Vandergrift, Pa., U1; Washington, Pa., W2 (2.25¢ lower on Type 430); J2; Baltimore, Md.; Middletown, O., A7; Massillon, O., R3; Gary, U1; Bridgeville, Pa., U2; New Castle, Ind., J2; Ft. Wayne, J4; Philadelphia, D5.

Strip: Midland, Pa., C11; Waukegan, Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Leeburg, Pa., A3; Bridgeville, Pa., U2; Detroit, A2; Canton-Massillon, O., R3; Harrison, N. J., D3; Youngstown, O.; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., U3 (25¢ per lb higher); W1 (25¢ per lb higher); New Bedford, Mass., R6; Gary, U1.

Bar: Baltimore, A7; S. Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1; F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; Syracuse, N. Y., C11; Watervliet, N. Y., A3; Waukegan, A5; Canton, O., T3; Ft. Wayne, A4; Philadelphia, D5; Detroit, R3; Gary, U1.

Wire: Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, A4; Harrison, N. J., D3; Baltimore, A7; Dunkirk, A3; Monessen, Pa., F1; Syracuse, C11; Bridgeville, U2.

Structural: Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11; S. Chicago, U1.

Plates: Brackenridge, Pa., A3; Chicago, U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., J2; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, R3; Cantonville, Pa., C15; Philadelphia, D5; Vandergrift, Pa., U1; Gary, U1.

Forged discs, die blocks, rings: Pittsburgh, C11; Syracuse, C11; Ferndale, Mich., A3; Washington, Pa., J2.

Forging billets: Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11; Detroit, R3; Munhall, Pa., S. Chicago, U1.

## Demand Up, Prices Climb

**Scrap scarcity develops despite strike . . . Prices climb in most markets . . . Brokers raise buying prices to cover old orders . . . Scrap collections continue at low rate.**

**BULLETIN**—Late purchases in the major markets raised prices as much as \$4 for No. 1 grades and secondary grades in varying amounts. Purchases were of substantial tonnages and established new price levels. Previously, broker activity and some minor mill purchases had indicated a rising market in spite of the steel strike.

◆ **THE MARKET** continued to defy the rules and maintained its upward climb in the face of a continuing steel strike.

In most markets, prices rose on the basis of broker buying, with dealers holding on to what they have in hopes of higher prices when the steel strike ends.

But in spite of some speculative quality of the market, little scrap is available at any price. Dealer stocks are far from high; generation of scrap by industrial plants has fallen off more than seasonably.

Operating mills are having difficulty maintaining their inventory and are having to go far afield to obtain satisfactory amounts of scrap. Brokers in most markets are offering, frequently with no takers, \$2 to \$3 higher than prices quoted a week ago.

All eyes in the trade will be on automotive lists closing this week. Tonnage is off and demand is high. Estimates range from moderate to high increases over last month, but higher levels are generally forecast.

**Pittsburgh . . .** Overall strength of the market is as apparent in Pittsburgh as anywhere. Brokers were paying \$2 to \$3 higher prices to cover commitments. Mills are laying down scrap where they can at higher prices. Low phos was purchased at \$57 to set the pace of price increases in steelmaking grades with broker buy-

ing establishing new prices in both No. 1 and No. 2 grades.

**Chicago . . .** Scrap continues to grow tighter as material is pulled from the area. Low industrial scrap return and weak country collections keep dealer stocks low. Attempts to buy long are meeting with virtually no success. Those mills writing new orders are paying stiffer prices. Offers of \$2 over previous price levels fail to pull in scrap. Railroad lists are closing at \$2 to \$5 over previously established levels. Broker buying at \$2 over last week's delivered prices is common, and even this has not brought out any substantial quantities.

**Philadelphia . . .** Market showed an upsurge despite the strike. Purchases of industrial scrap by both a non-striking and a struck mill helped boost steelmaking, electric furnace and some blast furnace grades \$1. There is no doubt more scrap is moving now than at any time since the strike began. One dealer said market has reached point where strike has had maximum effect and now prices are starting to bounce back. Another claims that if the strike were over tomorrow, prices would jump \$3-\$4 immediately.

**New York . . .** Continued strong demand from exporters and those Eastern Pennsylvania mills still operating has boosted steelmaking grades and turnings in this area. Local mills are reported to have advanced their buying prices as much as \$2 per ton in the hope of bringing out more and better material. No. 1 steel is now moving here at \$45 per ton. Cast prices are unchanged.

**Detroit . . .** Prices of No. 1 grades and No. 2 bundles advanced another \$2 this week on the strength of broker buying. Current strength is expected to be maintained with the closing of the August lists later in the week. Vigorous bidding for even less scrap than the amount produced this month

is expected to send prices even higher.

**Cleveland . . .** Real tip-off on strength of the market is expected next week with monthly auto lists but some prices edged \$1-\$2 on small sale. Since delivery on lists is delayed, spirited bidding is expected in hopes strike will be settled. Prices being offered dealers are high as dealers hold on to small inventories expecting to get more later. Brokers thus have not yet covered a 3-week old order for electric furnace grades in the Valley at \$53.

**Birmingham . . .** Although the large mills in the South are shut down, and only a couple of electric furnaces operating, there is considerable market activity. Prices offered by mills in the North not affected by the strike are drawing shipments by barge and rail. Cast market is showing strength and export market is very strong.

**St. Louis . . .** With steel mills here unaffected by the strike, the market is very strong. Scrap is most difficult to obtain and until better movement begins, mills are eating into their stocks. Distress scrap which mills expected would follow the strike has failed to develop. Dealers are holding scrap in anticipation of still higher prices when the strike is ended.

**Cincinnati . . .** Most dealers are holding on to the little scrap available, and though \$2-\$3 higher prices are being widely offered by brokers, some for their own account, no sales at higher figures have been made. Both major area mills continue production. New buying programs expected next week will set the trend for immediate future. Some tonnage continues upriver to working mills.

**Buffalo . . .** There is little activity in the market here. Dealers aren't building up scrap piles as quickly as had been expected. Receipts are very slow, due partly to strikes and vacations.

**Boston . . .** The market showed renewed strength with most grades on the upturn. New buying, strong undertones and an increased export market raised prices of most grades. No. 1 steelmaking all jumped \$3, with turnings and cast grades also registering varying increases.

**West Coast . . .** Scrap collection is sluggish. And much of what is collected goes to exporters, who continue active. Result: no scrap glut and steady prices in all major markets here.





## A Money-Making "Scraper" That's Quick on its Feet

Here are a few of the scrap handling problems a Hydrocrane will whip for you.

### Widely Scattered Pickup Sites

A Hydrocrane is fast. Mounted on a conventional truck, it moves through traffic and over highways at speeds up to 50 mph. Gets to the job faster — gets job done faster.

### Heavy Loads

A Hydrocrane is powerful. Select the size to fit your needs — the 9-ton H-5 or the smaller capacity H-3. Solid outriggers, set hydraulically in seconds, provide solid base even on rough, uneven ground. Heavy loads are eased onto trucks with hydraulic precision, saving costly truck damage.

### Cramped Quarters in Plants, Yards

A Hydrocrane is compact. With the shortest

tail swing of any crane of comparable capacity, it gets into spots impossible for ordinary cranes. The telescoping boom reaches out for loads through doorways or windows if necessary — retracts and swings over cab for quick drive-away.

### Rising Labor Costs

A Hydrocrane is easy to operate. Simple, clearly marked, finger-tip, hydraulic levers permit even inexperienced operators to handle it well with very little practice. Hydrocrane and operator load as much scrap as several crews of laborers.

Contact your Bucyrus-Erie distributor for a demonstration of this nifty "SCRAPPER." Or get more facts by writing the manufacturer.

139H56

# BUCYRUS-ERIE COMPANY

SOUTH MILWAUKEE, WISCONSIN

# Scrap Prices (Effective July 24, 1956)

## Pittsburgh

No. 1 hvy. melting	\$50.00 to \$51.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 bundles	50.00 to 51.00
No. 2 bundles	40.00 to 41.00
Machine shop turn.	32.00 to 33.00
Mixed bor. and ma. turn.	32.00 to 33.00
Shoveling turnings	36.00 to 37.00
Cast iron borings	36.00 to 37.00
Low phos. punch'g's plate.	57.00 to 58.00
Heavy turnings	46.00 to 47.00
No. 1 RR. hvy. melting	58.00 to 59.00
Scrap rails, random lgh.	63.00 to 64.00
Rails 2 ft and under	67.00 to 68.00
RR. steel wheels	59.00 to 60.00
RR. spring steel	59.00 to 60.00
RR. couplers and knuckles	59.00 to 60.00
No. 1 machinery cast.	54.00 to 55.00
Cupola cast.	46.00 to 47.00
Heavy breakable cast.	44.00 to 45.00

## Chicago

No. 1 hvy. melting	\$46.00 to \$47.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 factory bundles	52.00 to 53.00
No. 1 dealers' bundles	47.00 to 48.00
No. 2 dealers' bundles	36.00 to 37.00
Machine shop turn.	26.00 to 27.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	28.00 to 29.00
Low phos. forge crops	58.00 to 59.00
Low phos. punch'g's plate	54.00 to 55.00
Low phos. 3 ft and under	54.00 to 55.00
No. 1 RR. hvy. melting	51.00 to 52.00
Scrap rails, random lgh.	62.00 to 63.00
Rerolling rails	70.00 to 72.00
Rails 2 ft and under	70.00 to 71.00
Locomotive tires, cut	57.00 to 58.00
Cut bolsters & side frames	57.00 to 58.00
Angles and splice bars	63.00 to 64.00
RR. steel car axles	70.00 to 72.00
RR. couplers and knuckles	56.00 to 57.00
No. 1 machine cast.	49.00 to 50.00
Cupola cast.	46.00 to 47.00
Heavy breakable cast.	40.00 to 41.00
Cast iron brake shoe	40.00 to 41.00
Cast iron wheel	51.00 to 52.00
Malleable	60.00 to 61.00
Stove plate	42.00 to 44.00
Steel car wheels	56.00 to 57.00

## Philadelphia Area

No. 1 hvy. melting	\$51.00 to \$52.00
No. 2 hvy. melting	43.00 to 44.00
No. 1 bundles	51.00 to 52.00
No. 2 bundles	40.00 to 41.00
Machine shop turn.	33.00 to 34.00
Mixed bor. short turn.	35.00 to 36.00
Cast iron borings	37.00 to 38.00
Shoveling turnings	37.00 to 38.00
Clean cast chem. borings	42.00 to 43.00
Low phos. 5 ft and under	51.00 to 52.00
Low phos. 2 ft and under	53.00 to 54.00
Low phos. punch'g's	53.00 to 54.00
Elec. furnace bundles	52.00 to 53.00
Heavy turnings	45.00 to 46.00
RR. steel wheels	60.00 to 61.00
RR. spring steel	60.00 to 61.00
Rails 18 in. and under	65.00 to 66.00
Cupola cast.	48.00 to 50.00
Heavy breakable cast.	51.00 to 52.00
Cast iron car wheels	67.00 to 68.00
Malleable	64.00 to 65.00
Unstripped motor blocks	38.00 to 39.00
No. 1 machinery cast.	64.00 to 65.00

## Cleveland

No. 1 hvy. melting	\$45.00 to \$46.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 bundles	45.00 to 46.00
No. 2 bundles	33.00 to 34.00
No. 1 busheling	45.00 to 46.00
Machine shop turn.	29.00 to 30.00
Mixed bor. and turn.	33.00 to 34.00
Shoveling turnings	33.00 to 34.00
Cast iron borings	33.00 to 34.00
Cut struct'l & plates, 2 ft & under	54.00 to 55.00
Drop forge flashings	45.00 to 46.00
Low phos. punch'g's plate	46.00 to 47.00
Foundry steel, 2 ft & under	51.00 to 52.00
No. 1 RR. heavy melting	51.50 to 52.50
Rails 2 ft and under	71.00 to 72.00
Rails 18 in. and under	72.00 to 73.00
Railroad grate bars	39.00 to 40.00
Steel axle turnings	35.00 to 36.00
Railroad cast	53.00 to 54.00
No. 1 machinery cast.	53.00 to 54.00
Stove plate	50.00 to 51.00
Malleable	59.00 to 60.00

## Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

## Youngstown

No. 1 hvy. melting	\$50.00 to \$51.00
No. 2 hvy. melting	44.00 to 45.00
No. 1 bundles	50.00 to 51.00
No. 2 bundles	40.00 to 41.00
Machine shop turn.	29.00 to 30.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	32.00 to 33.00
Low phos. plate	54.00 to 55.00

## Buffalo

No. 1 hvy. melting	\$44.00 to \$45.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 busheling	44.00 to 45.00
No. 2 bundles	44.00 to 45.00
No. 1 bundles	33.00 to 34.00
Machine shop turn.	25.00 to 26.00
Mixed bor. and turn.	27.00 to 28.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	27.00 to 28.00
Low phos. plate	52.00 to 53.00
Scrap rails, random lgh.	57.00 to 58.00
Rails 2 ft and under	65.00 to 66.00
RR. steel wheels	60.00 to 61.00
RR. spring steel	60.00 to 61.00
RR. couplers and knuckles	60.00 to 61.00
No. 1 machinery cast.	50.00 to 51.00
No. 1 cupola cast.	48.00 to 49.00

## Detroit

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$41.00 to \$42.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 bundles, openhearth	41.00 to 42.00
No. 2 bundles	30.00 to 31.00
New busheling	41.00 to 42.00
Drop forge flashings	40.50 to 41.50
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	22.00 to 23.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	22.00 to 23.00
Low phos. punch'g's plate	41.00 to 42.00
No. 1 cupola cast.	41.00 to 42.00
Heavy breakable cast.	34.00 to 35.00
Stove plate	35.00 to 36.00
Automotive cast.	44.00 to 45.00

## St. Louis

No. 1 hvy. melting	\$41.50 to \$42.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 bundles	46.00 to 47.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	27.00 to 28.00
Cast iron borings	29.00 to 30.00
Shoveling turnings	29.00 to 30.00
No. 1 RR. hvy. melting	52.50 to 53.50
Rails, random lengths	60.00 to 61.00
Rails 18 in. and under	62.00 to 63.00
Locomotive tires uncut	53.00 to 54.00
Angles and splice bars	57.00 to 58.00
Std. steel car axles	68.50 to 69.50
RR. specialties	58.50 to 59.50
Cupola cast	48.00 to 49.00
Heavy breakable cast.	42.00 to 43.00
Cast iron brake shoes	45.00 to 46.00
Stove plate	44.00 to 45.00
Cast iron car wheels	50.00 to 51.00
Rerolling rails	72.00 to 73.00
Unstripped motor blocks	40.00 to 41.00

## Boston

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$39.00 to \$40.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 bundles	39.00 to 40.00
No. 2 bundles	27.50 to 28.00
No. 1 busheling	39.00 to 40.00
Elec. furnace, 3 ft & under	39.00 to 40.00
Machine shop turn.	24.00 to 24.50
Mixed bor. and short turn.	25.00 to 26.00
Shoveling turnings	28.00 to 28.50
Clean cast chem. borings	28.00 to 29.00
No. 1 machinery cast.	42.50 to 43.50
Mixed cupola cast.	37.00 to 37.50
Heavy breakable cast.	39.50 to 40.50
Stove plate	35.00 to 36.00
Unstripped motor blocks	27.50 to 28.00

## New York

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$45.00 to \$46.00
No. 2 hvy. melting	36.00 to 37.00
No. 2 bundles	33.00 to 34.00
Machine shop turn.	27.00 to 27.50
Mixed bor. and turn.	27.00 to 27.50
Shoveling turnings	31.00 to 32.00
Clean cast chem. borings	29.00 to 30.00
No. 1 machinery cast	46.00 to 46.50
Mixed yard cast	43.00 to 43.50
Charging box cast	43.00 to 43.50
Heavy breakable cast	43.00 to 43.50
Unstripped motor blocks	32.00 to 33.00

## Birmingham

No. 1 hvy. melting	\$34.00 to \$35.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 bundles	34.00 to 35.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	25.00 to 26.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	20.00 to 21.00
Electric furnace bundles	43.00 to 44.00
Bar crops and plate	51.00 to 52.00
Structural and plate, 2 ft.	50.00 to 51.00
No. 1 RR. hvy. melting	45.00 to 46.00
Scrap rails, random lgh.	56.00 to 57.00
Rails, 18 in. and under	60.00 to 61.00
Angles & splice bars	54.00 to 55.00
Rerolling rails	64.00 to 65.00
No. 1 cupola cast.	48.50 to 49.50
Stove plate	47.00 to 48.00
Charging box cast	32.00 to 33.00
Cast iron car wheels	39.00 to 40.00
Unstripped motor blocks	37.50 to 38.50
Mashed tin cans	15.00 to 16.00

## Cincinnati

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$42.50 to \$43.50
No. 2 hvy. melting	33.50 to 34.50
No. 1 bundles	42.50 to 43.50
No. 2 bundles	31.50 to 32.50
Machine shop turn.	25.00 to 26.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	28.00 to 29.00
Low phos. 18 in. & under	51.00 to 52.00
Rails, random lengths	57.00 to 58.00
Rails, 18 in. and under	64.00 to 65.00
No. 1 cupola cast.	43.00 to 44.00
Hvy. breakable cast.	43.00 to 44.00
Drop broken cast.	52.00 to 53.00

## San Francisco

No. 1 hvy. melting	\$43.00
No. 2 hvy. melting	42.00
No. 1 bundles	42.00
No. 2 bundles	35.00
No. 3 bundles	29.00
Machine shop turn.	24.00
Cast iron borings	25.00
No. 1 RR. hvy. melting	43.00
No. 1 cupola cast.	48.00

## Los Angeles

No. 1 hvy. melting	\$42.00
No. 2 hvy. melting	38.00
No. 1 bundles	41.00
No. 2 bundles	31.00
No. 3 bundles	27.00
Machine shop turn.	\$21.00 to 22.00
Shoveling turnings	24.00
Cast iron borings	24.00
Elec. furn. 1 ft and under	42.00
No. 1 RR. hvy. melting	42.00
No. 1 cupola cast.	45.00

## Seattle

No. 1 hvy. melting	\$44.00
No. 2 hvy. melting	40.00
No. 2 bundles	31.00
No. 3 bundles	27.00
No. 1 cupola cast.	45.00
Mixed yard cast.	45.00

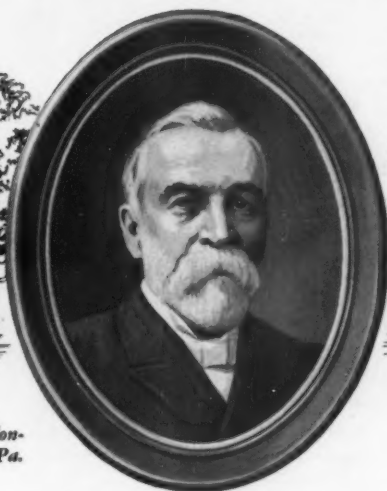
## Hamilton, Ont.

No. 1 hvy. melting	\$43.00
No. 2 hvy. melting	38.00
No. 1 bundles	43.00
No. 2 bundles	35.00
Mixed steel scrap	37.00
Bushelings	33.50
Bush., new fact., prep'd	41.00
Bush., new fact., unprep'd	37.00
Machine shop turn.	21.00
Short steel turn.	24.00
Mixed bor. and turn.	22.00
Rails, rerolling	51.00
Cast scrap	50.00

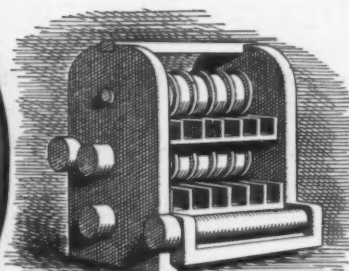
# GREAT MOMENTS IN THE HISTORY OF IRON AND STEEL MAKING



Birthplace of John Fritz. Londonderry Township, Chester County, Pa.



*John Fritz*



Model of Fritz' first 3-high mill.

*This is the fourteenth in a series of outstanding inventions and developments that have contributed to the progress of the iron and steel industry.*

## 1857-The Invention of the 3-High Mill

The introduction of the 3-high mill in 1857 by John Fritz proved a boon to the mills desperately struggling to keep up with the growing demand for rails. The 2-high mill had too many limitations. The new development eliminated the idle passes of the 2-high mill, and by using lifting devices to raise the bar to the top level, it was possible to process greater lengths and weights.

Through the years, our engineers and scientists made further improvements in production and quality control. In 1874 it took 69 mills to produce sufficient rails to meet our industrial

demands. By 1950 our entire output of standard rails was produced by only 11 mills.

Today, the buyer of rails receives a product that has been tested and inspected more exhaustively than any other heavy product in the steel industry.

These special steels require special scrap of known analysis — a problem we are more than qualified to solve because of our experience, equipment, personnel, and the strategic location of our offices. We would like to put our facilities to work for you.

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## LEADERS IN IRON AND STEEL SCRAP SINCE 1889



# Congress Passes Tungsten Bill

**Government will buy 1.25 million tons of tungsten during next 2½ years . . . Export license requirements for refined copper relaxed in 3rd quarter.**

♦ GOVERNMENT action supplied most of the headlines in a quiet week for nonferrous metals.

Probably the most emphatic occurrence was the passage by Congress of a Minerals Purchase Bill. It provides for the purchase of tungsten (also columbium, tantalum, fluor spar and asbestos), by the government.

Not more than 1.25 million short tons of tungsten concentrates, with no more than 5000 tons per month per producer, will be purchased within the next 2½ years.

Base price is \$55 per short ton at the mill where the concentrate is produced.

The bill is intended to be a stop-gap until a long-range program can be worked out.

Tungsten is considered a strategic mineral. However, U. S. producers cannot normally compete on a cost basis with foreign producers, hence production has been dropping. Government action, it is hoped, will provide an incentive for domestic production.

Bureau of Foreign Commerce, U. S. Dept. of Commerce, has relaxed special licensing requirements for exports of certain copper raw materials for the third quarter.

Exporters are not required to submit evidence of availability in support of applications to export refined copper (Schedule B, No. 641200) and copper ores, concen-

trates, mattes and other unrefined copper (Schedule B, No. 640100).

In addition, export of scrap which originated in a U. S. territory or possession outside continental limits, collected under an approved contract with a U. S. government agency, will not be charged against the third-quarter quota.

September 15 has been set up as a cutoff date for export of certain aluminum and copper items under third quarter license. Deadline applies to new and old aluminum scrap and remelt ingots; new and old copper scrap; new and old copper-base alloy scrap containing 40 pct or more copper, but excluding copper-nickel alloy scrap; and copper base alloy ingots and other crude forms.

Office of Defense Mobilization announced copper and aluminum allotments for "A" products for the fourth quarter.

Copper allotments were 2.6 pct lower and aluminum 3.2 pct higher than for the third quarter.

Allotments of nickel alloys were made for the first time.

The allotments represent purchase authority to prime contractors and producers of special military equipment, at the mill level. Breakdown (in pounds):

	4th quarter 1956	3rd quarter 1956
aluminum	128,964,000	124,955,000
copper	50,709,000	52,087,000
nickel	23,850,000	.....

## Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	July 18	July 19	July 20	July 21	July 23	July 24
Copper, electro, Conn.	40.00	40.00	40.00	40.00	40.00	40.00
Copper, Lake, delivered	40.00	40.00	40.00	40.00	40.00	40.00
Tin, Straits, New York	96.750	96.375	96.375	....	95.75	95.75*
Zinc, East St. Louis	13.50	13.50	13.50	13.50	13.50	13.50
Lead, St. Louis	15.80	15.80	15.80	15.80	15.80	15.80

Note: Quotations are going prices.

\*Tentative

NICKEL . . . This market was also relatively quiet, but what news there was, was good news.

International Nickel Co., and Falconbridge Nickel Mines have come to agreement concerning an ore body which lies partly in the Levack property of Inco and partly in the Fecunis Lake property of Falconbridge.

Engineering staffs of both companies are now working on details for an unusual joint mining operation which would be the most efficient possible.

Exploration and development in the Fecunis area will be under Falconbridge supervision, but ore will be hauled from both sections by International Nickel for delivery to both companies for processing.

Agreement will eliminate the necessity of leaving a boundary wall between the two properties.

A report from Victor E. Cooley, deputy director of ODM indicates large bodies of nickel ore in the Philippines, but indicates that substantial production could not occur in less than four or five years.

Mr. Cooley said reports show that total Philippine reserves of nickel bearing laterite ores may approach 550 million tons, containing about 4.4 million tons of nickel.

This would be the fifth largest nickel source in the world.

Unofficially the Philippine government has said that if current tests and studies bear out the preliminary findings it would give maximum encouragement to private development projects.

ALUMINUM . . . Total primary aluminum output during the first half of 1956, 1,720,607,779 lb, is an all time production record, according to Donald M. White, of the Aluminum Assn.

Output is 13 pct higher than same period in 1955.

First quarter output, 838,102,586 lb was an all time quarterly high, which was promptly broken by second quarter production, 882,505,193 lb.

The all time high monthly output was established in May when 301,600,064 lb of aluminum were produced.

BRASS, BRONZE . . . Combined shipments of ingot brass and bronze for June 1956 dropped to 18,842 tons, as compared to both previous month, 23,437 tons, and the same month in 1955, 23,141 tons.

This is the first time in several years that the total shipments have dropped below 20,000 tons.

Information was made public by the Defense Council of the Ingot Brass and Bronze Industry, Chicago.





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# Nonferrous Prices (Effective July 24, 1956)

## MILL PRODUCTS

(Cents per lb, unless otherwise noted)

### ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate  
(“F” temper except 6061-0)

Alloy	.032	.081	.136-.249	.250-3.
1100, 3003....	42.3	40.2	39.0	38.0
5052.....	46.8	44.9	43.2	41.4
6061-0.....	46.9	42.7	40.9	40.8

### Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6-8.....	43.1-44.8	58.1-61.7
12-14.....	13.8-15.2	59.0-63.3
24-26.....	46.8-47.2	69.2-73.6
36-38.....	55.1-55.7	92.0-95.8

### Screw Machine Stock—2011-T-3

Size*	1/4	3/8-5/8	3/4-1	1 1/4-1 1/2
Price	56.0	54.9	53.6	51.6

### Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length*→	72	96	120	144
.019 gage.....	\$1.310	\$1.742	\$2.175	\$2.605
.024 gage.....	1.630	2.177	2.707	3.247

### MAGNESIUM

(f.o.b. shipping pt., carload frt. allowed)

#### Sheet and Plate

Type→	Gage→	.250-3.00	.250-2.00	.158	.081	.032
FSI Stand, Grade			65.6	66.5	73	100
FSI Spec.			88.0	91.1	103.5	163.1
Tread Plate			97.8	68.9		
Tooling Plate	70.2					

### Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (FS)	86.4-69.0	87.5-69.6	72.1-72.7	84.9-85.8
Spec. Grade (AZ31B)	81.4-84.0	82.5-84.6	87.1-87.7	99.9-100.8

### Alloy Ingot

AZ91B (Die Casting)..... 35 (delivered)  
AZ63A, AZ92A, AZ91C (Sand Casting) 39.25 (Velasco, Tex.)

### NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

“A” Nickel Monel

	Nickel	Inconel
Sheet, CR.....	102	99
Strip, CR.....	102	125
Rod, Bar, HR.....	87	93
Angles, HR.....	87	93
Plate, HR.....	97	95
Seamless tube.....	122	153
Shot, blocks.....	71	

## COPPER, BRASS, BRONZE

(Freight included on 500 lbs)

	Sheet	Wire	Rod	Tube
Copper	61.63			61.82
Brass, 70/30	52.10	52.64		55.01
Brass, Low	55.85	56.39	55.75	58.66
Brass, R L	57.19	57.73	57.13	60.00
Brass, Naval	55.72		50.03	58.88
Muntz Metal	53.84	47.85	49.65	
Comm. Br.	59.08	59.62	59.02	61.64
Mang. Br.	59.46		53.56	
Phos. Br. 5%	79.58		80.08	

## TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, \$12.10-\$12.60; alloy, \$15.00-\$15.75; Plate, HR, commercially pure, \$10.00-\$10.60; alloy, \$11.50-\$12.00. Wire, rolled and/or drawn, commercially pure, \$9.00-\$11.50; alloy, \$11.50; Bar, HR or forged, commercially pure, \$7.55-\$7.80; alloy, \$7.55-\$7.76.

## PRIMARY METAL

(Cents per lb, unless otherwise noted)

Aluminum ingot, 98+%, 10,000 lb.	25.90
freight alloyed.....	24.00
Aluminum pig.....	33.50
Antimony, American, Laredo, Tex.	33.50
Beryllium copper, per lb conta'd Be.	\$43.00
Beryllium aluminum 5% Be, Dollars	
per lb contained Be.....	\$74.75
Bismuth, ton lots.....	\$ 2.25
Cadmium, del'd.....	\$ 1.70
Cobalt, 97-99% (per lb).....	\$2.60 to \$2.67
Copper, electro, Conn. Valley.....	40.00
Copper, Lake, delivered.....	40.00
Gold, U. S. Treas., per troy oz.....	\$35.00
Indium, 99.9% dollars per troy oz. \$ 2.25	
Iridium, dollars per troy oz.....	\$100 to \$120
Lead, St. Louis.....	15.80
Lead, New York.....	16.00
Magnesium, 99.5-4%, f.o.b. Velasco, Tex., 10,000 lb. pig.....	33.75
ingot.....	34.50
Magnesium, sticks, 100 to 500 lb.....	56.00
Mercury, dollars per 76-lb flask, f.o.b. New York.....	\$255 to \$257
Nickel electro.....	64.50
Nickel oxide sinter at Copper Cliff, Ont., contained nickel.....	60.75
Palladium, dollars per troy oz.....	\$23 to \$24
Platinum, dollars per troy oz.....	\$103 to \$105
Silver, New York, cents per troy oz.....	90.125
Tin, New York.....	95.75*
Titanium sponge, grade A-1, \$2.70 to \$3.00	
Zinc, East St. Louis.....	13.50
Zinc, New York.....	14.00
Zirconium sponge.....	\$10.00

\*Tentative.

## REMETEL METALS

### Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot	
No. 115.....	35.50
No. 120.....	34.25
No. 123.....	33.25
80-10-10 ingot	
No. 305.....	38.75
No. 315.....	37.00
88-10-2 ingot	
No. 210.....	50.25
No. 215.....	46.50
No. 245.....	41.50
Yellow ingot	
No. 405.....	28.75
Manganese bronze	
No. 421.....	31.25

### Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper max.....	26.50-27.75
0.60 copper max.....	26.25-27.50
Piston alloys (No. 122 type).....	26.00-26.50
No. 12 alum. (No. 2 grade).....	25.25-26.25
108 alloy.....	25.50-26.50
195 alloy.....	26.50-27.50
13 alloy (0.60 copper max.).....	26.25-27.50
AXS-679.....	25.50-26.25

## Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97 1/2%.....	25.00-26.00
Grade 2—92-95%.....	24.00-25.00
Grade 3—90-92%.....	23.00-24.00
Grade 4—85-90%.....	22.50-23.50

## SCRAP METALS

### Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper.....	36	35 1/2
Yellow brass.....	27 1/2	25 1/2
Red brass.....	31 1/2	31 1/2
Comm. bronze.....	23 1/2	22 1/2
Mang. bronze.....	25 1/2	24 1/2
Yellow brass rod ends	27	

### Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire.....	33 1/2
No. 2 copper wire.....	32
Light copper.....	29 1/2
*Refinery brass.....	29 1/2

\* Dry copper content.

### Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire.....	33 1/2
No. 2 copper wire.....	32
Light copper.....	29 1/2
No. 1 composition.....	27 1/2
No. 1 comp. turnings.....	16
Hvy. yellow brass solids.....	27
Brass pipe.....	19
Radiators.....	21

### Aluminum

Mixed old cast.....	16 — 17
Mixed new clips.....	17 1/2 — 18 1/2
Mixed turnings, dry.....	17 — 18

### Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

### Copper and Brass

No. 1 copper wire.....	30 — 30 1/2
No. 2 copper wire.....	27 1/2 — 28
Light copper.....	25 — 25 1/2
Auto radiators (unwashed).....	17 1/2 — 18
No. 1 composition.....	23 1/2 — 24
No. 1 composition turnings.....	22 1/2 — 23
Unlined red car boxes.....	18 1/2 — 19 1/2
Cocks and faucets.....	19 — 19 1/2
Clean heavy yellow brass.....	16 — 16 1/2
Brass pipe.....	21 — 21 1/2
New soft brass clippings.....	22 1/2 — 23
No. 1 brass rod turnings.....	20 — 20 1/2

### Aluminum

Alum. pistons and struts.....	7 — 7 1/2
Aluminum crankcases.....	12 — 12 1/2
1100 (2S) aluminum clippings.....	15 1/2 — 16
Old sheet and utensils.....	12 — 12 1/2
Borings and turnings.....	8 1/2 — 9
Industrial castings.....	12 — 12 1/2
2024 (24S) clippings.....	13 1/2 — 14

### Zinc

New zinc clippings.....	7 1/2 — 8
Old zinc.....	4 1/2 — 5
Zinc routings.....	2 1/2 — 3
Old die cast scrap.....	2 1/2 — 2 3/4

### Nickel and Monel

Pure nickel clippings.....	\$1.65-\$1.90
Clean nickel turnings.....	1.50
Nickel anodes.....	\$1.65-\$1.90
Nickel rod ends.....	\$1.65-\$1.90
New Monel clippings.....	75-85
Clean Monel turnings.....	60-70
Old sheet Monel.....	65-75
Nickel silver clippings, mixed	21
Nickel silver turnings, mixed	18

### Lead

Soft scrap lead.....	12 1/2 — 13
Battery plates (dry).....	7 — 7 1/2
Batteries, acid free.....	4 1/2

### Miscellaneous

Block tin.....	80 — 81
No. 1 pewter.....	62 1/2 — 63
Auto babbitt.....	42 — 42 1/2
Mixed common babbitt.....	13 — 13 1/2
Solder joints.....	18 — 18 1/2
Siphon tops.....	42
Small foundry type.....	15 1/2 — 15 3/4
Monotype.....	14 1/2 — 15
Lino. and stereotype.....	13 — 13 1/2
Electrotype.....	12 1/2 — 12 3/4
Hand picked type shells.....	10 — 10 1/2
Lino. and stereo. dross.....	5 1/2 — 5 3/4
Electro. dross.....	4 1/2 — 4 3/4

IRON AGE		Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.												
STEEL PRICES  (Effective July 24, 1956)		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Re-rolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled
EAST	Bethlehem, Pa.			\$96.00 B3		4.65 B3	6.80 B3	4.65 B3						
	Buffalo, N. Y.	\$68.50 B3	\$84.50 R3, B3	\$96.00 R3, B3	5.45 B3	4.65 B3	6.80 B3	4.65 B3	4.325 R3,B3	6.25 B3 6.25 R7,S10	6.825 B3	9.10 B3		
	Claymont, Del.													
	Harrison, N. J.													13.45 C11
	Consabohocken, Pa.								4.775 A2	6.70 A2	6.825 A2			
	New Bedford, Mass.									6.70 R6				
	Johnstown, Pa.	\$68.50 B3	\$84.50 B3	\$96.00 B3		4.65 B3	6.80 B3							
	Boston, Mass.									6.80 T8				13.80 T8
	New Haven, Conn.									7.30 D1 6.70 At				
	Phoenixville, Pa.					5.15 P2		5.15 P2						
	Sparrows Pt., Md.								4.325 B3	6.25 B3	6.425 B3	9.10 B3		
	Bridgeport, Wallingford, Conn.	\$73.50 N8	\$89.50 N8						4.625 N8	6.70 W1			7.50 N8	
Pawtucket, R. I. Worcester, Mass.									6.80 N7,A5				13.80 A5, N7	
MIDDLE WEST	Alton, Ill.								4.50 L1					
	Ashland, Ky.								4.325 A7					
	Canton-Massillon, Dover, Ohio		\$86.50 R3	\$96.00 R3						6.85 G4				13.45 G4
	Chicago, Ill.	\$68.50 U1	\$84.50 R3, U1 89.50 W8	\$96.00 R3, U1 \$101.00 W8	5.45 U1	4.60 U1, 4.85 W8	6.74 U1, Y1	4.60 U1	4.725 A1 4.575 W8 4.325 N4	6.35 T8 6.95 A1			7.45 W8	13.45 T8
	Cleveland, Ohio									6.25 A5,J3		9.30 A5		13.45 A5
	Detroit, Mich.			\$96.00 R5					4.425 G3,M7	6.35 D2,G3, M2,P11 6.95 D1	6.525 G3	9.20 D2, G3		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	\$68.50 U1	\$84.50 U1	\$96.00 U1, Y1	6.45 J3	4.60 U1 J3	6.75 U1, J3		4.325 J3, U1,Y1	6.35 J3 6.25 Y1	6.425 J3, U1,Y1	9.30 Y1	7.20 Y1, U1	
	Sterling, Ill.								4.425 N4					
	Indianapolis, Ind.									6.40 C5				
	Newport, Ky.												7.20 N5	
	Middletown, Ohio									6.45 A7				
	Niles, Warren, Ohio Sharon, Pa.		\$94.50 C10	\$106.00 C10					4.325 S1, R3	6.25 S1, R3,T4	6.425 S1, R3	9.10 S1, R3	7.20 S1	13.45 S1
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	\$68.50 U1, J3	\$84.50 J3, U1,C11	\$96.00 U1, C11	5.45 U1	4.60 U1, J3	6.75 U1, J3	4.60 U1	4.325 P6	6.25 S7,B4			7.20 S9	13.45 S9
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.					4.60 W3			4.325 W3	6.25 F3,W3	6.425 W3	9.10 W3		
	Youngstown, Ohio			\$96.00 Y1, C10			6.75 Y1		4.325 U1, Y1	6.25 Y1,C5	6.425 U1, Y1	9.30 Y1	7.20 U1, Y1	13.45 C5
	WEST	Fontana, Cal.	\$82.50 K1	\$100.50 K1	\$127.00 K1		5.30 K1	7.90 K1	5.90 K1	5.575 K1	8.70 K1	8.825 K1		9.65 K1
Geneva, Utah			\$84.50 C7			4.60 C7	6.75 C7							
Kansas City, Mo.						4.70 S2	6.85 S2				6.675 S2		7.45 S2	
Los Angeles, Torrance, Cal.			\$94.00 B2	\$116.00 B2		5.30 C7, B2	7.45 B2		5.875 C7 B2	8.30 C1			8.40 B2	
Minnequa, Colo.						4.90 C6			5.425 C6					
Portland, Ore.						5.35 O2								
San Francisco, Niles, Pittsburgh, Cal.			\$94.00 B2			5.25 B2, P9	7.40 B2		5.875 B2, C7					
Seattle, Wash.			\$98.00 B2			5.35 B2	7.50 B2		5.325 B2					
Atlanta, Ga.									4.525 A8					
SOUTH	Fairfield, Ala. City, Birmingham, Ala.	\$68.50 T2	\$84.50 T2			5.10 C16 4.60 R3,T2	6.75 T2		4.325 R3,T2 4.825 C10		6.425 T2			
	Houston, Lone Star, Texas	\$74.50 L3	\$89.50 S2	\$101.00 S2		4.70 S2	6.85 S2				6.675 S2		7.45 S2	

**STEEL PRICES**

(Effective July 24, 1956)

	SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
	Hot-rolled 16 ga. & hvyr.	Cold-rolled	Galvanized 16 ga.	Enameling 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Holloware Enameling 29 ga.
EAST	Bethlehem												
	Buffalo, N. Y.	4.325 B3	5.325 B3			6.375 B3	7.875 B3			5.375 W6	† Special coated mfg. terms deduct 50¢ from 1.25-lb. cokes base box price. Can-making quality blackplate 55 to 128 lb. deduct \$2.20 from 1.25-lb. cokes base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add \$1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conahobocken, Pa.	4.775 A2	4.775 A2			6.825 A2							
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johantown, Pa.									5.375 B3			
	Fairless, Pa.	4.375 U1	5.375 U1			6.425 U1	7.925 U1				\$9.70 U1	\$8.40 U1	
	New Haven, Conn.												
	Phoenixville, Pa.												
MIDDLE WEST	Sparrows Pt., Md.	4.325 B3	5.325 B3	5.85 B3		6.375 B3	7.875 B3	8.60 B3		5.475 B3	\$9.70 B3	\$8.40 B3	
	Worcester, Mass.									5.675 A5			
	Trenton, N. J.												
	Alton, Ill.									5.55 L1			
	Ashland, Ky.	4.325 A7		5.85 A7	5.90 A7								
	Canton-Massillon, Dover, Ohio			5.85 R1, R3									
	Chicago, Joliet, Ill.	4.725 A1 4.575 W8				6.375 U1				5.375 N4 5.375 A5, R3			
	Sterling, Ill.									5.475 N4			
	Cleveland, Ohio	4.325 J3, R3	5.325 J3, R3		5.90 R3	6.375 J3, R3	7.875 J3, R3			5.375 A5			
	Detroit, Mich.	4.425 G3, M2	5.425 G3 5.325 M2			6.475 G3	7.975 G3						
	Newport, Ky.	4.725 N5	5.925 N5	5.85 N5									
	Gary, Ind. Harbor, Indiana	4.325 J3, U1, Y1	5.325 J3, U1, Y1	5.85 U1, J3	5.90 U1, J3	6.25 U1	6.375 Y1, U1, J3	7.875 U1, Y1		5.375 Y1	\$9.60 U1, Y1	\$8.30 J3, U1, Y1	6.65 U1, Y1
	Granite City, Ill.	4.95 G2	6.825 G2	6.65 G2	6.60 G2							\$8.40 G2	7.25 G2
	Kokomo, Ind.			6.35 C9						5.825 C9			
	Mansfield, Ohio	4.325 E2	5.325 E2			6.25 E2							
	Middletown, Ohio		5.325 A7	5.85 A7	5.90 A7	6.25 A7							
	Niles, Warren, Ohio Sharon, Pa.	4.325 S1, R3, N3	5.325 R3, N3	5.85 R3 6.85 N3	5.90 N3	6.25 N3	6.375 S1, R3	7.875 R3				\$8.30 R3	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.325 J3, U1, P6	5.325 J3, U1, P6	5.85 U1	5.90 U1, A7		6.375 J3, U1	7.875 U1	8.60 U1	5.625 P6 5.375 A5	\$9.60 J3, U1	\$8.30 J3, U1	6.65 U1
	Portsmouth, Ohio	4.725 P7	5.925 P7							5.725 P7			
	Weirton, Wheeling, Follansbee, W. Va.	4.325 W3, W5	5.325 W3, W5, F3	5.85 W3, W5		6.25 W3, W5	6.375 W3	7.875 W3			\$9.60 W3, W5	\$8.30 W3, W5	6.65 F3, W5
	Youngstown, Ohio	4.325 U1, Y1	5.325 Y1		5.90 Y1		6.375 U1, Y1	7.875 Y1		5.375 Y1			
WEST	Fontana, Cal.	5.575 K1	7.075 K1			7.625 K1	9.625 K1				\$10.35	\$9.05	\$7.75
	Geneva, Utah	4.425 C7											
	Kansas City, Mo.									5.625 S2			
	Los Angeles, Torrance, Cal.									6.175 B2			
	Minnequa, Colo.									5.625 C6			
	San Francisco, Niles, Pittsburg, Cal.	5.025 C7	6.275 C7	6.60 C7						5.675 C7	\$10.35 C7	\$9.05 C7	
	Seattle, Wash.												
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	4.325 R3, T2	5.325 T2	5.85 R3, T2			6.375 T2			5.625 R3 5.375 T2	\$9.70 T2	\$8.40 T2	
	Houston, Tex.									5.625 S2			



IRON AGE		Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.										
STEEL PRICES		BARS						PLATES				WIRE
(Effective July 24, 1956)		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				5.575 B3	7.425 B3	6.80 B3					
	Buffalo, N. Y.	4.65 B3,R3	4.65 B3,R3	6.30 B5	5.575 B3,R3	7.425 B3,B5	6.80 B3	4.50 B3,R3				6.60 W6
	Claymont, Del.							5.35 C4		6.30 C4	6.725 C4	
	Coatesville, Pa.							4.80 L4		6.30 L4	6.725 L4	
	Conshohocken, Pa.							4.95 A2	6.025		7.175 A2	
	Harrisburg, Pa.							5.10 P2	5.575 C3			
	Hartford, Conn.			6.75 R3		7.725 R3						
	Johnstown, Pa.	4.65 B3	4.65 B3		5.575 B3		6.80 B3	4.50 B3		6.30 B3	6.725 B3	6.60 B3
	Fairless, Pa.	4.80 U1	4.80 U1		5.725 U1							
	Newark, N. J.			6.70 W10		7.60 W10						
	Camden, N. J.			6.70 P10								
	Bridgeport, Putnam, Conn.	4.80 N8		6.80 W10	5.725 N8			4.750 N8				
	Sparrows Pt., Md.		4.65 B3					4.50 B3		6.30 B3	6.725 B3	6.70 B3
MIDDLE WEST	Palmer, Worcester, Roadville, Mass. Milton, Pa.	5.25 M7	5.25 M7	6.70 W11 6.45 C14 6.70 B5		7.725 A5,B5		4.50 R3				6.90 A5 6.90 W6
	Spring City, Pa.			6.35 K4		7.60 K4						
	Alton, Ill.	4.85 L1										6.775 L1
	Ashland, Newport, Ky.							4.50 A7,N5		6.30 N5		
	Canton-Massillon, Mansfield, Ohio	4.75 R3		6.25 R2,R3	5.575 R3,T5	7.425 R2,R3,T5		4.50 E1				
	Chicago, Joliet, Ill.	4.65 U1,R3 4.90 W8 5.15 P13	4.65 N4,R3 5.15 P13	6.25 B5,W10, A5,L2 6.50 W8	5.575 U1,R3, 5.825 W8	7.425 A5, W10,L2,B5 7.675 W8		4.50 U1,I3,R3 4.90 A1 4.75 W8	5.575 U1	6.30 U1	6.725 U1	6.60 A5,R3, N4,W7
	Cleveland, Ohio	4.65 R3	4.65 R3	6.25 A5,C13		7.425 A5,C13	6.80 R3	4.60 J3,R3	5.575 J3		6.725 R3,J3	6.60 A5, C13
	Detroit, Mich.	4.75 G3	4.75 G3	5.90 R5 6.45 B5 6.50 P3 6.10 P8	5.575 R5 5.675 G3	7.425 R5 7.625 B5,P3, P8	6.90 G3	4.60 G3			6.825 G3	
	Duluth, Minn.											6.60 A5
	Gary, Ind. Harbor, Crawfordsville	4.65 I3, U1, Y1	4.65 I3, U1, Y1	6.25 M5,R3	5.575 I3, U1, Y1	7.425 M5, R3	6.80 U1,I3, Y1	4.50 I3, U1, Y1	5.575 I3	6.30 U1,Y1	6.725 U1, I2,Y1	6.35 M4
	Granite City, Ill.							5.15 G2				7.20 C9
	Kokomo, Ind.											6.70 N4
	Sterling, Ill.	4.75 N4	4.75 N4									
WEST	Niles, Warren, Ohio Sharon, Pa.	4.65 R3,C10		6.25 C10	6.25 C10	7.425 C10	6.80 R3	4.50 S1,R3		6.30 S1	6.725 S1	
	Pittsburgh, Pa. Midland, Pa.	4.65 J3, U1, C11	4.65 J3, U1	6.25 A5,C8, C11,J3, W10,B4,R3	5.575 U1,C11	7.425 A5,C11, W10,C8,R3	6.80 J3, U1	4.50 J3, U1	5.575 U1	6.30 U1	6.725 J3, U1	6.60 A5,J3, P6
	Portsmouth, Ohio											7.10 P7
	Weirton, Wheeling, Fellenshee, W. Va.	4.65 W3						4.50 W3,W5				
	Youngstown, Ohio	4.65 U1,Y1, C10,R3	4.65 U1,Y1, R3	6.25 Y1, U1	5.575 U1,Y1, C10	7.425 Y1,C10, F2	6.80 U1,Y1	4.50 U1,Y1, R3		6.30 Y1	6.725 Y1	6.60 Y1
	Emeryville, Cal.	5.40 J5	5.40 J5									
	Fontana, Cal.	5.80 K1	5.35 K1		7.175 K1		7.95 K1	5.65 K1		7.70 K1	7.875 K1	
	Geneva, Utah							4.50 C7			6.725 C7	
	Kansas City, Mo.	4.90 S2	4.90 S2		5.825 S2		7.05 S2					6.85 S2
	Los Angeles, Torrance, Cal.	5.35 B2,C7	5.35 B2,C7	7.70 R3	6.625 B2		7.50 B2				7.625 B2	7.55 B2
	Minneapolis, Colo.	5.10 C6	5.10 C6					5.35 C6				6.85 C6
	Portland, Ore.	5.40 O2	5.40 O2									
	San Francisco, Niles, Pittsburg, Cal.	5.35 C7 5.40 B2,P9	5.35 C7 5.40 B2,P9				7.55 B2					7.55 C7 7.55 C6
	Seattle, Wash.	5.40 B2,P12, N6	5.40 B2,P12				7.55 B2	5.40 B2		7.20 B2	7.625 B2	
SOUTH	Atlanta, Ga.	5.15 A8	5.15 A8									6.80 A8
	Fairfield, Ala. City, Birmingham, Ala.	4.65 T2,R3 5.15 C16	4.65 T2,R3 5.15 C16				6.80 T2	4.50 T2,R3			6.725 T2	6.60 R3,T2
	Houston, Ft. Worth, Lone Star, Tex.	4.90 S2	4.90 S2		5.825 S2		7.05 S2	4.85 L3 4.80 S2		6.40 S2	6.825 S2	6.85 S2

# Steel Prices (Effective July 24, 1956)

## Key to Steel Producers

### With Principal Offices

- A1 Acme Steel Co., Chicago  
A2 Alan Wood Steel Co., Conahocken, Pa.  
A3 Allegheny Ludlum Steel Corp., Pittsburgh  
A4 American Cladmetals Co., Carnegie, Pa.  
A5 American Steel & Wire Div., Cleveland  
A6 Angell Nail & Chaplet Co., Cleveland  
A7 Armco Steel Corp., Middletown, Ohio  
A8 Atlantic Steel Co., Atlanta, Ga.  
B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.  
B2 Bethlehem Pacific Coast Steel Corp., San Francisco  
B3 Bethlehem Steel Co., Bethlehem, Pa.  
B4 Blair Strip Steel Co., New Castle, Pa.  
B5 Bliss & Laughlin, Inc., Harvey, Ill.  
B6 Brook Plant, Wickwire Spencer Steel Div., Birdersboro, Pa.  
C1 Calstrip Steel Corp., Los Angeles  
C2 Carpenter Steel Co., Reading, Pa.  
C3 Central Iron & Steel Co., Harrisburg, Pa.  
C4 Claymont Products Dept., Claymont, Del.  
C5 Cold Metals Products Co., Youngstown, O.  
C6 Colorado Fuel & Iron Corp., Denver  
C7 Columbia Geneva Steel Div., San Francisco  
C8 Columbia Steel & Shafting Co., Pittsburgh  
C9 Continental Steel Corp., Kokomo, Ind.  
C10 Copperweld Steel Co., Pittsburgh, Pa.  
C11 Crucible Steel Co. of America, Pittsburgh  
C12 Cumberland Steel Co., Cumberland, Md.  
C13 Cuyahoga Steel & Wire Co., Cleveland  
C14 Compressed Steel Shafting Co., Readville, Mass.  
C15 G. O. Carlson, Inc., Thorndale, Pa.  
C16 Connors Steel Div., Birmingham  
C17 Chester Blast Furnace, Inc., Chester, Pa.  
D1 Detroit Steel Corp., Detroit  
D2 Detroit Tube & Steel Div., Detroit  
D3 Driver Harris Co., Harrison, N. J.  
D4 Dickson Weatherproof Nail Co., Evanston, Ill.  
D5 Henry Dison & Sons, Inc., Philadelphia  
E1 Eastern Stainless Steel Corp., Baltimore  
E2 Empire Steel Co., Mansfield, O.  
E3 Firth Sterling, Inc., McKeesport, Pa.  
E4 Hitzimomms Steel Corp., Youngstown  
E5 Follansbee Steel Corp., Follansbee, W. Va.  
G1 Globe Iron Co., Jackson, O.

- G2 Granite City Steel Co., Granite City, Ill.  
G3 Great Lakes Steel Corp., Detroit  
G4 Greer Steel Co., Dover, O.  
H1 Hanna Furnace Corp., Detroit  
I2 Ingersoll Steel Div., Chicago  
I3 Inland Steel Co., Chicago  
I4 Interlake Iron Corp., Cleveland  
J1 Jackson Iron & Steel Co., Jackson, O.  
J2 Jessop Steel Corp., Washington, Pa.  
J3 Jones & Laughlin Steel Corp., Pittsburgh  
J4 Joslyn Mfg. & Supply Co., Chicago  
J5 Judson Steel Corp., Emeryville, Calif.  
K1 Kaiser Steel Corp., Fontana, Cal.  
K2 Keystone Steel & Wire Co., Peoria  
K3 Koppers Co., Granite City, Ill.  
K4 Keystone Drawn Steel Co., Spring City, Pa.  
L1 Laclede Steel Co., St. Louis  
L2 La Salle Steel Co., Chicago  
L3 Lone Star Steel Co., Dallas  
L4 Lukens Steel Co., Coatesville, Pa.  
M1 Mahoning Valley Steel Co., Niles, O.  
M2 McLouth Steel Corp., Detroit  
M3 Mercer Tube & Mfg. Co., Sharon, Pa.  
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.  
M5 Monarch Steel Div., Hammond, Ind.  
M6 Mystic Iron Works, Everett, Mass.  
M7 Milton Steel Products Div., Milton, Pa.  
N1 National Supply Co., Pittsburgh  
N2 National Tube Div., Pittsburgh  
N3 Niles Rolling Mill Div., Niles, O.  
N4 Northwestern Steel & Wire Co., Sterling, Ill.  
N5 Newport Steel Corp., Newport, Ky.  
N6 Northwest Steel Rolling Mills, Seattle  
N7 Newman Crosby Steel Co., Pawtucket, R. I.  
N8 Northeastern Steel Corp., Bridgeport, Conn.  
O1 Oliver Iron & Steel Co., Pittsburgh  
O2 Oregon Steel Mills, Portland  
P1 Page Steel & Wire Div., Monessen, Pa.  
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.  
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.  
P4 Pittsburgh Coke & Chemical Co., Pittsburgh  
P5 Pittsburgh Screw & Bolt Co., Pittsburgh  
P6 Pittsburgh Steel Co., Pittsburgh  
P7 Portsmouth Div., Detroit Steel Corp., Detroit  
P8 Plymouth Steel Co., Detroit

- P9 Pacific States Steel Co., Niles, Cal.  
P10 Precision Drawn Steel Co., Camden, N. J.  
P11 Production Steel Strip Corp., Detroit  
P12 Pacific Steel Rolling Mills, Seattle  
P13 Phoenix Mfg. Co., Joliet, Ill.  
R1 Reeves Steel & Mfg. Co., Dover, O.  
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.  
R3 Republic Steel Corp., Cleveland  
R4 Roebling Sons Co., John A., Trenton, N. J.  
R5 Rotary Electric Steel Co., Detroit  
R6 Rodney Metals, Inc., New Bedford, Mass.  
R7 Rome Strip Steel Co., Rome, N. Y.  
S1 Sharon Steel Corp., Sharon, Pa.  
S2 Sheffield Steel Corp., Kansas City  
S3 Shenango Furnace Co., Pittsburgh  
S4 Simonds Saw and Steel Co., Fitchburg, Mass.  
S5 Sweet's Steel Co., Williamsport, Pa.  
S6 Standard Forging Corp., Chicago  
S7 Stanley Works, New Britain, Conn.  
S8 Superior Drawn Steel Co., Monaca, Pa.  
S9 Superior Steel Corp., Carnegie, Pa.  
S10 Seneca Steel Service, Buffalo  
T1 Tonawanda Iron Div., N. Tonawanda, N. Y.  
T2 Tennessee Coal & Iron Div., Fairfield  
T3 Tennessee Products & Chem. Corp., Nashville  
T4 Thomas Strip Div., Warren, O.  
T5 Tunkin Steel & Tube Div., Canton, O.  
T6 Tremont Nail Co., Warcham, Mass.  
T7 Texas Steel Co., Fort Worth  
T8 Thompson Wire Co., Boston  
U1 United States Steel Corp., Pittsburgh  
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.  
U3 Ulbrich Stainless Steels, Wallingford, Conn.  
U4 U. S. Pipe & Foundry Co., Birmingham  
W1 Wallingford Steel Co., Wallingford, Conn.  
W2 Washington Steel Corp., Washington, Pa.  
W3 Weirton Steel Co., Weirton, W. Va.  
W4 Wheatland Tube Co., Wheatland, Pa.  
W5 Wheeling Steel Corp., Wheeling, W. Va.  
W6 Wickwire Spencer Steel Div., Buffalo  
W7 Wilson Steel & Wire Co., Chicago  
W8 Wisconsin Steel Co., S. Chicago, Ill.  
W9 Woodward Iron Co., Woodward, Ala.  
W10 Wyckoff Steel Co., Pittsburgh  
W11 Worcester Pressed Steel Co., Worcester, Mass.  
W12 Wallace Barnes Steel Div., Bristol, Conn.  
Y1 Youngstown Sheet & Tube Co., Youngstown, O.

## PIPE AND TUBING

Base discounts (per) l.b. mills. Base price about \$200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS									
	1/2 In.		3/4 In.		1 In.		1 1/4 In.		1 1/2 In.		2 In.		2 1/2-3 In.		2 In.		2 1/2 In.		3 In.		3 1/2-4 In.			
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.		
Sparrows Pt. B3	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75										
Youngstown R3	18.50	1.25	21.50	5.25	24.00	8.75	26.50	10.00	27.00	11.00	27.50	11.50	29.00	11.75										
Fontana K1	6.00	13.25	9.00	+9.25	11.50	+5.75	14.00	+4.00	14.50	+3.00	15.00	+2.50	16.50	+1.75										
Pittsburgh J3	18.50	1.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	4.00	+11.	10.50	+6.25	13.00	+3.75	14.50	+2.25		
Alton, Ill. L1	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75										
Sharon M3	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75										
Fairless N2	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75										
Pittsburgh N1	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	4.00	+11.	10.50	+6.25	13.00	+3.75	14.50	+2.25		
Wheeling W5	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75										
Wheatland W4	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	4.00	+11.	10.50	+6.25	13.00	+3.75	14.50	+2.25		
Youngstown Y1	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	4.00	+11.	10.50	+6.25	13.00	+3.75	14.50	+2.25		
Indiana Harber Y1	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.00	26.00	11.50	26.50	12.00	28.00	11.75										
Lorain N2	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	4.00	+11.	10.50	+6.25	13.00	+3.75	14.50	+2.25		
E&TR STRONG PLAIN ENDS																								
Sparrows Pt. B3	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75										
Youngstown R3	23.00	7.25	27.00	11.25	29.00	14.75	29.50	14.00	30.00	15.00	30.50	15.50	31.00	14.75										
Fairless N2	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75										
Fontana K1	10.50		14.50		16.50		17.00		17.50		18.00		18.50											
Pittsburgh J3	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	5.50	+8.50	13.00	+2.75	15.50	+0.25	20.50	4.75		
Alton, Ill. L1	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75										
Sharon M3	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75										
Pittsburgh N1	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	5.50	+8.50	13.00	+2.75	15.50	+0.25	20.50	4.75		
Wheeling W5	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75										
Wheatland W4	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75										
Youngstown Y1	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	5.50	+8.50	13.00	+2.75	15.50	+0.25	20.50	4.75		
Indiana Harber Y1	22.00	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75										
Lorain N2	21.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	5.50	+8.50	13.00	+2.75	15.50	+0.25	20.50	4.75		

Threads only, butt weld and seamless 2 1/4 pt. higher discount. Plain ends, butt weld and seamless, 3-in. and under, 5 1/2 pt. higher discount. Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: 1/2, 3/4 and 1-in., 2 pt.; 1 1/4, 1 1/2 and 2-in., 1 1/2 pt.; 2 1/2 and 3-in., 1 pt., e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price new 13.50¢ per lb.

## TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	\$1.60	T-1
18	4	1	—	8	2.305	T-4
18	4	1	—	—	1.765	T-3
1.5	4	1.5	8	—	.96	M-1
8	4	8	6	—	1.35	M-2
8	4	8	6	—	1.105	M-3

High-carbon chromium... .77 D-3, D-5  
Oil hardened manganese... .42 O-3  
Special carbon... .39 W-1  
Extra carbon... .33 W-1  
Regular carbon... .275 W-1  
Warehouse prices on east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

## CLAD STEEL

Base prices, cents per lb. f.a.b.

Cladding	Plate (A3, J2, L4)			Sheet (J2)	
	10 pct	15 pct	20 pct	20 pct	
304.....	30.30	33.15	36.85	32.50	
316.....	35.50	38.45	41.40	47.00	
321.....	32.00	34.85	37.75	37.25	
347.....	34.40	37.90	41.40	48.25	
405.....	25.00	29.00	33.35		
416, 430.....	25.30	29.10	32.85		

CR Strip (#9) Copper, 10 pct, 2 sides, 42.15; 1 side, 33.40.

## WAREHOUSES

Cities	City Delivery Charge	Sheets		Strip		Plates Shapes		Bars		Alloy Bars			
		Hot-Rolled	Cold-Rolled	Galvanized (10 gage)	Hot-Rolled	Hot-Rolled	Cold-Rolled	Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled 4815	Hot-Rolled 4815 As rolled	Hot-Rolled 4815 As rolled
Baltimore.....	\$10	7.31	8.32	8.37	7.65	7.63	7.93	7.61	8.62	14.38	13.44	16.36	16.29
Birmingham.....	15	8.50	7.93	8.85	7.06	6.99	7.28	7.08	9.35		13.96		16.49
Boaton.....	10	8.22	8.17	10.42	8.31	7.95	7.93	7.77					
Buffalo.....	15	8.72	9.42	10.32	8.81	8.51	8.37	9.96	14.65	14.10	17.61	17.31	
Chicago.....	15	7.85	8.65	10.64	8.00	9.01	8.87	8.81	10.46	14.81	14.26		
Cincinnati.....	15	7.78	8.64	9.75	7.86	8.30	8.25	8.05	14.70	14.15	17.50	17.20	
Cleveland.....	15	7.90	8.63	9.75	8.10	8.39	8.55	8.16	8.80	14.60	14.05	17.40	17.10
Cleveland.....	15	7.28	8.30	9.10	7.46	7.77	7.91	7.48	8.15	13.41	13.36	16.26	16.41
Denver.....	15	7.78	8.64	9.60	7.96	8.27	8.41	7.98	8.65	14.41	13.86	17.20	16.91
Detroit.....	15	8.60	10.76	11.22	8.90	8.60	8.75	8.90	9.82				17.97
Houston.....	15	7.97	8.83	10.03	8.14	8.38	8.55	8.20	8.69	14.59	14.04	17.39	17.09
Kansas City.....	20	7.85	8.75	10.42	8.53	8.00	8.20	8.25	10.10	14.35	15.90	17.15	17.05
Los Angeles.....	10	8.45	9.31	10.42	8.53	8.77	8.75	9.12	9.32	15.02	14.47	17.82	17.52
Memphis.....	10	8.25	10.10	11.10	8.60	8.85	8.40	8.25	11.00		14.50		18.10
Milwaukee.....	15	8.10	8.96		8.18	8.42	8.48	9.05	9.65				
New Orleans.....	15	7.37	8.48	9.34	7.45	7.69	7.75	7.51	8.09	14.54	13.39	17.24	16.44
New York.....	10	7.87	8.73	9.84	7.95	8.19	8.25	8.01	8.59		13.89		16.94
Portland.....	10	7.20	8.35		7.45	7.40	7.70	7.50	9.55				
San Francisco.....	10	8.38	9.23	10.23	8.68	8.81	8.71	8.76	10.37	14.72	14.17	17.52	17.22
Seattle.....	20	7.25			7.65	7.45	7.95	7.65	9.50				
St. Louis.....	15	7.44	8.54	9.51	8.09	7.82	7.85	8.33	8.62	14.50	13.45	17.30	16.50
Pittsburgh.....	15	7.94	9.04	10.01	8.59	8.32	8.35	9.12			13.95		17.00
Portland.....	15	7.78	8.89	10.05	7.96	8.10	8.03	7.92	8.65	14.35	13.80	17.15	16.85
Salt Lake City.....	20	7.80	8.80	10.65	8.00	7.75	7.85	7.95	12.20		15.00		17.50
San Francisco.....	10	8.60	10.15		9.35		8.15						
Seattle.....	00	8.60	10.60		9.35	9.20	9.15						
St. Paul.....	25	8.30	9.75	10.25	8.45	8.40	8.35	8.25	11.55		14.50		18.10
St. Paul.....	15	8.75	10.50	10.90	8.90	8.50	8.50	8.60	12.25		14.75		17.00
St. Paul.....	15	8.07	8.93	10.04	8.15	8.39	8.48	8.21	8.94	14.64	14.09	17.44	17.14
St. Paul.....	25	8.48	9.18	10.45	8.56	8.80	8.78	7.74	9.35	15.05	14.50	17.85	17.55

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity. Exceptions: (\*) 1500 to 9999 lb. (\*) 1000 lb or over. (\*) \$3.25 delivery. (\*) 1000 to 1999 lb. \$4.35 delivery.

\*Plus analysis charge.

†Deduct for country delivery.

\*\*F.O.B. Plant, warehouse price.

## ELECTRICAL SHEETS

22-Gage	F.a.b. Mill Cents Per Lb	Hot-Rolled (Cut Length)*	Cold-Reduced (Coiled or Cut Length)	
			Semi-Processed	Fully Processed
Field.....	9.00	9.00		
Armature.....	9.95	9.95		
Elect.....	10.55	10.20	10.70	
Motor.....	11.55	11.20	11.70	
Dynamo.....	12.45	12.10	12.60	
Trans. 72.....	12.80	13.65	13.55	
Trans. 65.....	13.35			
Trans. 58.....	13.85			
Trans. 52.....	14.85			
			Grain Oriented	
			Trans. 80.....	17.45
			Trans. 73.....	17.95

Producing points: Beech Bottom (W3); Brackenridge (A3); Granite City (G2); Indiana Harbor (I3); Mansfield (E2); Newport, Ky. (N3); Niles, O. (N3); Vandergrift (U1); Warren, O. (R3); Zanesville (A7).  
\* Coils 75¢ higher.

## LAKE SUPERIOR ORES

\$1.50% Fe natural content, delivered lower Lake ports. Prices for 1956 season. Freight changes for seller's account.

Openhearth lump.....	\$12.10
Old range, bessemer.....	11.85
Old range, nonbessemer.....	11.60
Mosab, bessemer.....	11.00
Mosab, nonbessemer.....	10.85
High phosphorus.....	10.85

Metropolitan Price, dollars per 100 lb.

## MERCHANT WIRE PRODUCTS

F.a.b. Mill	Standard & Coated Nails		Wire		Fence Posts		Single Loop Barb Wire		Galv. Barbed and Twisted Barb Wire		March Wire Ann'd		March Wire Gals	
	Col	Col	Col	Col	Col	Col	Col	Col	Col	Col	Col	Col	Col	Col
Alabama City R3.....	152	162	173	175	7.40	7.90								
Aliquippa, Pa. J3.....	152	162	173	175	7.40	7.90								
Atlanta A8.....	154	167	177	180	7.80	8.125								
Bartonsville K2.....	169	184	195	197	8.10	8.70								
Buffalo W6.....	152	166	175	178	7.50	7.90								
Chicago, Ill. N4**.....	152	166	175	178	7.50	7.90								
Cleveland A6.....	157	171	180	183	7.40	7.90								
Cleveland A5.....	152	162	173	175	7.50	8.10								
Crawfordsville M4**.....	154	168	177	181	7.60	8.20								
Denora, Pa. A5.....	152	162	173	175	7.50	7.90								
Duluth A5.....	152	162	173	175	7.50	7.90								
Fairfield, Ala. T2.....	152	162	173	175	7.50	7.90								
Galveston D4.....	157	171	180	183	7.40	7.90								
Houston S2.....	157	171	180	183	7.40	7.90								
Johannesburg, Pa. B3*.....	152	166	175	178	7.40	7.90								
Joliet, Ill. A5.....	152	162	173	175	7.50	8.10								
Kokomo, Ind. C9.....	169	180	195	197	8.10	8.50								
Los Angeles B2*.....	157	167	178	180	7.65	8.05								
Kansas City S2.....	157	167	178	180	7.65	8.05								
Minneapolis C6.....	157	167	178	180	7.75	8.15								
Minneapolis P6.....	152	162	173	175	7.50	7.90								
Mobile, Ill. R3.....	152	162	173	175	7.50	7.90								
Pittsburgh, Cal. C7.....	171	185	199	205	8.45	8.85								
Portsmouth P7.....	152	162	173	175	7.40	7.90								
Randolph, Pa. A5.....	152	162	173	175	7.40	7.90								
Se. Chicago A5.....	152	162	173	175	7.40	7.90								
S. San Francisco C6.....	157	167	178	180	7.65	8.05								
Sparrows Pt. B3*.....	154	167	178	181	7.50	8.00								
Strothers, O. V1.....	158	171	182	185	7.70	8.20								
Warren, Pa. A5.....	152	162	173	175	7.40	7.90								
Williamport, Pa. S3.....	152	162	173	175	7.40	7.90								

Galvanized products computed with zinc at 5¢ per lb. Exceptions: \*zinc at 12.5¢ per lb; \*\* 13¢ zinc.

## C-R SPRING STEEL

Cities	City Delivery Charge	CARBON CONTENT				
		Cents Per Lb F.a.b. Mill	0.28-0.40	0.41-0.60	0.61-1.00	1.01-1.35
Bristol, Conn. W12.....			10.90	13.05	15.75	
Buffalo, N. Y. R2.....	7.00	8.95	10.50	12.65	15.35	
Carnegie, Pa. S9.....	9.05	10.60	12.75	15.35		
Cleveland A5.....	7.10	9.05	10.60	12.75	15.45	
Detroit D1.....	7.20	9.15	10.70	12.85		
Detroit D2.....	7.20	9.15	10.70	12.85		
Harrison, N. J. C11.....	7.15	9.10	10.50	12.65	15.35	
Indianapolis C5.....	7.15	9.10	10.50	12.65	15.35	
New Castle, Pa. B4.....	7.00	8.95	10.50	12.65		
New Haven, Conn. D1.....	7.55	9.35	10.90	13.05		
Pawtucket, R. I. N7.....	7.65	9.35	10.90	13.05	15.75	
Pittsburgh S7.....	7.10	9.05	10.60	12.75	15.45	
Riversdale, Ill. A1.....	7.20	9.05	10.60	12.75	15.45	
Sharon, Pa. S1.....	7.10	9.05	10.60	12.75	15.45	
Trenton R4.....	7.55	9.35	10.90	13.05	15.75	
Wallingford W1.....	7.00	8.95	10.50	12.65	15.35	
Warren, Ohio T4.....	7.10	9.05	10.60	12.75	15.45	
Watson, W. Va. W3.....	7.45	9.35	10.90	13.05	15.75	
Warren, Mass. A5.....	7.45	9.35	10.90	13.05	15.75	
Youngstown C3.....	7.00	8.95	10.50	12.65	15.35	

## BOILER TUBES

Size	Seamless	Elec. Weld	H.R.	C.D.	H.R.
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## RAILS, TRACK SUPPLIES

F.o.b. Mi Cents Per Lb	No. 1 Std. Rail	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer U1	4.725	5.65	5.825	8.05			
Se. Chicago R3							
Ensley T2	4.725	5.65					
Fairfield T2	4.725	5.65		8.05	5.625		
Gary U1	4.725	5.65			5.625		
Ind. Harbor Y3	4.725	5.625	8.05		5.625		
Johnstown B3		5.65		8.05			
Joliet U1			5.825				
Kansas City S2				7.90			
Lackawanna B3	4.725	5.65	5.825		5.625		
Lakewood B3							
Minneapolis C6	4.725	6.15	5.825	7.90	5.625	12.15	
Pittsburgh O1					11.90	12.15	
Pittsburgh P5						12.15	
Pittsburgh J3				8.05			
Seattle B2				8.40	5.775	12.65	
Steelton B3	4.725		5.825		5.625		
Struthers Y1				8.05			
Torrance C7					5.775		
Williamsport S3		5.65					
Youngstown R3				8.05			

## COKE

Furnace, beehive (f.o.b. oven)	Net-Ton
Connellsville, Pa.	\$14.50
Foundry, beehive (f.o.b. oven)	\$17.00 to \$18.00
Foundry, oven coke	
Buffalo, del'd	\$28.75
Chicago, f.o.b.	\$27.00
Detroit, f.o.b.	\$27.50
New England, del'd	\$28.55
Seaboard, N. J., f.o.b.	\$26.75
Philadelphia, f.o.b.	\$26.50
Swedeland, Pa., f.o.b.	\$26.50
Painesville, Ohio, f.o.b.	\$27.50
Erie, Pa., f.o.b.	\$27.50
Cleveland, del'd	\$29.43
Cincinnati, del'd	\$28.59
St. Paul, f.o.b.	\$26.50
St. Louis, f.o.b.	\$28.50
Birmingham, f.o.b.	\$25.65
Lone Star, Tex., f.o.b.	\$19.50

## ELECTRODES

Cents per lb f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	23.00	40	100, 110	9.90
20	72	22.25	35	110	9.90
16 to 18	72	22.50	30	110	10.05
14	72	23.00	24	72 to 84	10.30
12	72	23.50	20	90	10.10
10	60	24.75	17	72	10.35
7	60	24.50	14	72	10.85
5	60	27.25	12	60	11.75
4	40	30.25	10	60	11.80
3	40	32.00	8	60	12.10
2 1/2	30	33.75			
2	24	52.50			

\* Prices shown cover carbon nipples.

## ELECTROPLATING SUPPLIES

Anodes	
(Cents per lb, f.o.b. allowed in quantity)	
Copper	
Cast elliptical, 18 in. or longer,	
5000 lb lots	62.92
Electrodeposited	50.28
Brass, 80-20, ball anodes, 2000 lb	
or more	60.00
Zinc, ball anodes, 2000 lb lots	21.25
(for elliptical add 2¢ per lb)	
Nickel, 99 pct plus, rolled carbon	90.50
(rolled depolarized add 3¢ per lb)	
Cadmium	\$1.70
Tin, ball anodes and elliptical	\$1.06 to \$1.10
Chemicals	
(Cents per lb, f.o.b. shipping point)	
Copper cyanide, 100 lb drum	80.50
Copper sulphate, 5 or more 100 lb	
bags, per cwt.	27.15
Nickel salts, single, 4-100 lb bags	38.25
Nickel chloride, freight allowed,	
300 lb	46.50
Sodium cyanide, domestic, f.o.b.	
N. Y., 200 lb drums	22.35
(Philadelphia price 22.60)	
Zinc cyanide, 100 to 900 lb	55.55
Potassium cyanide, 100 lb drum	
N. Y.	48.00
Chromic acid, flake type, 1 to 20	
100 lb drums	29.25

## BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

## Machine and Carriage Bolt

	Discounts	Full case	Full case
		20,000 lb	Quantity or more
1/2 in. & smaller x 6 in. & shorter	61	63	
Larger than 1/2 in. diam. and all diam. longer than 6 in.	55	57	
Rolled thread carriage bolts 1/2 in. & smaller x 6 in. and shorter	61	63	
Lag, all diam. x 6 in. & shorter	61	63	
Lag, all diam. longer than 6 in.	55	57	
Plow bolts	61	63	

## Nuts, Hex, HP, reg. &amp; hvy.

3/4" or smaller	64	66
3/4" to 1 1/2" inclusive	63	65
1 1/2" to 1 3/4" inclusive	65	67
1 3/4" and larger	61	63

## C.P. Hex, regular &amp; hvy.

3/4" or smaller	64	66
3/4" and larger	61	63

## Hot Galv. Nuts (all types)

1 1/2" or smaller	44	47
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## Finished, Semi-finished, Hex Nuts

3/4" and smaller	66	66
3/4" and larger	63	63
Add 25% for less than case or keg quantity.		

## Rivets

	Base per 100 lb
1/2 in. and larger	\$9.95
7/16 in. and smaller	32

## Cap Screws

	Discount	H.C. Heat
	Bright Treated	
New std. hex head, pack-aged		
1/4" thru 1/2" diam. x 6" and shorter	34	20
9/16" and 5/8" x 6" and smaller and shorter	31	16
3/4" 3/8", 1" x 6" and shorter	9	+11
1/4" thru 1/2" diam. x 6" and shorter	49	41
9/16" and 5/8" diam. x 6" and shorter	43	39
3/4" 3/8", 1" x 6" and shorter	31	20
*Minimum quantity per item:		
15,000 pieces 1/4", 5/16", 3/8" diam.		
5,000 pieces 7/16", 1/2", 9/16", 5/8" diam.		
2,000 pieces 3/4", 1", 1 1/4" diam.		

## Machine Screws &amp; Stove Bolts

	Discount	Mach. Screws	Stove Bolts
Packaged, package list...	27	33	
Bulk, bulk list			
Quantity			
1/4-in. diam. & under	25,000-200,000	20	61
5/16-in. diam. & larger	15,000-100,000	20	61
All diam. over 3 in. long	5,000-100,000	—	61

## Machine Screw &amp; Stove Bolt Nuts

	Discount	Hex Square
Packaged, package list...	24	27
Bulk, bulk list		
Quantity		
3/4-in. diam. & smaller	25,000-200,000	18 20

## CAST IRON WATER PIPE INDEX

Birmingham	113.1
New York	125.6
Chicago	127.5
San Francisco-L. A.	134.8
Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1 issue. Source: U. S. Pipe and Foundry Co.	

## REFRACTORIES

Fire Clay Brick	Carloads per 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add \$5.00)	\$122.00
No. 1 Ohio	
Sec. quality, Pa., Md., Ky., Mo., Ill.	114.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add \$1.50)	18.00

## Silica Brick

Mt. Union, Pa., Ensley, Ala.	\$128.00
Childs, Hays, Pa.	138.00
Chicago District	138.00
Western Utah	144.00
California	151.00
Super Duty	
Hays, Pa., Athens, Tex., Windham, Warren, O.	145.00
Curtner, Calif.	163.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	21.00
Silica cement, net ton, bulk, Hays, Pa.	24.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	22.00
Silica cement, net ton, bulk, Utah and Calif.	32.00

## Chrome Brick

Standard chemically bonded, Balt.	\$91.00
Standards chemically bonded, Curt- ner, Calif. ....	101.25
Burned, Balt. ....	85.00

## Magnesite Brick

Standard Baltimore	\$114.00
Chemically bonded, Baltimore	102.00

## Grain Magnesite

Domestic, f.o.b. Baltimore in bulk fines removed.....	64.00
Domestic, f.o.b. Chewah, Wash., Luning, Nev. in bulk in sacks	40.00 46.00

## Dead Burned Dolomite

F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio.....	\$15.00
Midwest .....	15.60
Missouri Valley .....	14.00

## METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh	
Swedish sponge iron f.o.b. Riverton, N. J., ocean bags	8.50¢
Canadian sponge iron, Del'd in East, carloads	9.5¢
Domestic sponge iron, 98+%	
Fe, carload lots	8.5¢
Electrolytic iron, annealed, imported 99.5+%	27.5¢
domestic 99.5+%	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+%	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron size 5 to 10 micron, 98%, 00.8+%	\$8.6¢ to \$11.5¢
Aluminum freight allowed	38.00¢
Brass, 10 ton lots	\$7.50¢ to \$9.50¢
Copper, electrolytic	59.50¢
Copper, reduced	59.50¢
Cadmium, 100-199 lb, 95¢ plus metal value	
Chromium, electrolytic 99.85% min. Fe .03 max. Del'd	\$5.00
Lead	\$8.90¢ plus metal value
Manganese	70.0¢
Molybdenum, 99%	\$3.00 to \$3.25
Nickel, unannealed	\$1.00
Nickel, annealed	\$1.06
Nickel, spherical, unannealed	
#80	\$1.13
Silicon	43.50¢
Solder powder .70¢ to 9.0¢ plus met. value	
Stainless steel, 302	99.0¢
Stainless steel, 316	\$1.32
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	\$4.50
Zinc, 10 ton lots	\$18.75¢ to \$22.50¢





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## HAYWARD BUCKETS

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# Ferroalloy Prices

(Effective July 24, 1956)

## Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk carloads, del'd, 67-71% Cr, 30-1.00% max. Si.			
0.02% C	39.25	0.20% C	36.25
0.03% C	38.75	0.50% C	36.00
0.06% C	37.25	1.00% C	35.25
0.10% C	36.75	1.50% C	35.10
0.15% C	36.50	2.00% C	35.00
4.00-4.50% C, 67.70% Cr, 1-2% Si	26.25		
4.50-5.00% C, 67-64% Cr, 2.00-4.50% Si	25.00		
0.025% C (Simplex)	32.50		
0.10% C, 50-52% Cr, 2% max Si	33.75		
8.50% max. C, 50-55% Cr, 3-6% Si	22.50		
8.50% C, 50-55% Cr, 3% max Si	22.50		

## High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% of N.

## Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.	
0.10% max. C	\$1.27
0.50% max. C	1.27
9 to 11% C, 33-31% Cr, 0.75% Fe	1.36

## Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (1/4" thick) delivered packed. 99.80% min. Cr. (Metallic Base) Fe 0.20 max.	
Carloads	1.25
Ton lots	1.27
Less ton lots	1.29

## Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.)	
Contract price, carloads, delivered, lump, 2-in. x down, per lb of Cr, packed.	
Carloads	41.85
Ton lots	46.15
Less ton lots	48.65

## Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.	
30-33% Cr, 60-65% Si, 3.00 max. Fe.	
Carloads	23.00
Ton lots	26.75
Less ton lots	28.25

## Calcium-Manganese-Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.	
16-20% Ca, 14-18% Mn, 52-59% Si.	
Carloads	23.05
Ton lots	24.95
Less ton lots	26.95

## SMZ

Contract prices, cents per pound of alloy, delivered, 60-66% Si, 5-7% Mn, 5-7% Zr. 20% Fe 1/4 in. x 12 mesh.	
Ton lots	19.65
Less ton lots	20.90

## V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.	
Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

## Graphidex No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11% Ca 5 to 7%.	
Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

## Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.	
	Cents per-lb
Producing Point	
Marietta, Ashabula, O.: Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	10.75
Johnstown, Pa.	10.75
Sheridan, Pa.	10.75
Philo, Ohio	10.75
S. Duquesne	10.75
Add or subtract 0.1¢ for each 1 pct Mn above or below base content.	
Briquets, delivered, 66 pct Mn:	
Carloads, bulk	13.00
Ton lots packed	15.20

## Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.	
Manganese Silicon	
16 to 19% 3% max.	\$92.00
19 to 21% 3% max.	94.00
21 to 23% 3% max.	96.50

## Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.	
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.	
Carload, packed	45.75
Ton lots	47.25

## Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.	
Carloads	31.5
Ton lots	33.5
250 to 1999 lb	35.5
Premium for hydrogen-removed metal	0.75

## Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn.	
	22.85

## Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.			
	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	34.00	36.55	37.75
0.07% max. C	31.95	34.50	35.70
0.10% max. C	21.20	33.75	34.95
0.15% max. C	30.45	33.00	34.20
0.30% max. C	28.95	31.50	32.70
0.50% max. C	28.45	31.00	32.20
0.75% max. C, 90.85% Mn, 5.0-7.0% Si	25.45	28.00	29.20

## Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.	
Carload bulk	12.00
Ton lots	13.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet	13.55
Ton lots, packed	15.75

## Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.	
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## Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.		
	Ton lots	Carloads
98.50% Si, 2% Fe	23.75	21.45
98% Si, 1% Fe	23.25	21.95

## Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.	
Carloads, bulk	7.15
Ton lots, packed	9.75

## Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.			
50% Si	12.75	75% Si	15.40
65% Si	14.50	85% Si	17.10
90% Si	18.50		

## Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.			
	Cast	Turnings	Distilled
Ton lots	\$2.05	\$2.95	\$3.75
Less ton lots	2.40	3.30	4.55

## Ferrovandium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.	
Openhearth	3.10
Crucible	3.20
High speed steel (Primos)	3.30

Alifer, 20% Al, 40% Si, 40% Fe, Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound Contained Mo

	\$1.24
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Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	\$6.90
Less ton lots	6.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Sb plus Ta.

	\$4.65
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Ferromolybdenum, 55-75%, 200-lb containders, f.o.b. Langeloth, Pa., per pound contained Mo.

	\$1.54
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Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$4.00 unitage, per gross ton

10 tons to less carload	\$90.00
	\$110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti

	\$1.35
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Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti

	\$1.50
Less ton lots	\$1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton

	\$200.00
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Ferrotungsten, 1/4 x down, packed, per pound contained W, ton lots, delivered

	\$3.45
--	--------

Molybde oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa.

	\$1.32
bags, f.o.b. Washington, Pa. Langeloth, Pa.	\$1.30

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	17.50¢
Ton lots, packed lump	19.50¢
Less ton lots	20.00¢

Vanadium oxide, 56-59% V<sub>2</sub>O<sub>5</sub>, contract basis, per pound contained V<sub>2</sub>O<sub>5</sub>

	\$1.33
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Zirconium contract basis, per lb of alloy

35-40% f.o.b. freight allowed, carloads, packed	26.25¢
12-15%, del'd lump, bulk-carloads	8.50¢

## Boron Agents

Borasil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 2.14%, Si 40-45%, per lb contained 2

	\$5.25
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Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed

Ton lots per pound	14.00¢
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Ferroboreon, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots

	1.20
F.o.b. Wash., Pa.; Niagara Falls, N. Y., delivered 100 lb up	
10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

No. 1	\$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn., 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	\$1.46
Less ton lots	1.57

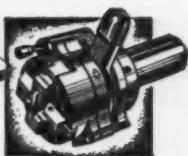
Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Fe, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots

	\$2.05
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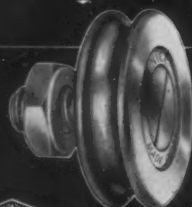
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## THE CLEARING HOUSE

### News of Used and Rebuilt Machinery

**Onward and Upward . . .** Even the potent trinity of a steel strike, vacations and hot weather is unable to slow significantly the strong demand for used tools and machinery in the New York area.

Some dealers concede that July business so far is down a bit from June, but there is almost universal agreement that trade will perk up healthily in another 30-45 days. And some firms report that business is already heading up from June levels. There is every indication that total 1956 dollar volume will pass that of the peak days during the Korean War.

**Still Squeezed . . .** But dealers complain that they are once more caught in the old cost-profit squeeze. They must pay such prices for used tools that profits are badly shaved. As it is, dealers' prices for good, late model used tools are uncomfortably close to new machine prices. There are reports that large 48-in. and over surface grinders of World War II vintage and later have been moved at new tool prices and even over.

Basic trouble is the scarcity of tools. And the trade expects equipment to get even tighter later on this year. Recent large auction sales in this and adjacent areas have helped, but not much. Prices at the sales ran too high to permit dealers to make any real money on resale. But this does not mean customers will not pay healthy money for good equipment. Tight money rates at the banks are not helping, to be sure, but the biggest trouble is lack of merchandise.

**Demand Strong . . .** "Almost anything is hard to get," comments one dealer. In addition to the large surface grinders already mentioned, machines in particularly short supply include cranes and all types of fabricating equipment—bending rolls, brakes, shears and ironworkers. Cranes are virtually nonexistent, and the demand for

sheet metal equipment has been called unprecedented. Some dealers note a slight easing in demand for cutting tools, but there is no real softening, and certainly no drop in prices. Demand is especially hot for heavier models.

**Outward Bound . . .** Export business continues to putt along, but is by no means exceptional. Some dealers say export inquiries have freshened a bit since the start of the steel strike. This is generally attributed to fear that the anticipated embargo on scrap exports later this year might be extended to cover used machinery. But most dealers feel such fears are groundless. They point to dollar restrictions as a heavy curb on export sales. Feeling is foreign business would spurt were buyers permitted to pay in dollars.

**Rosy View . . .** Biggest reason for what slight slowness there is this month is generally given as vacation shutdowns and just plain hot weather. Customers are staying out of the hot city as much as possible. Effects of the steel strike so far are negligible. Several reasons are cited for this lack of panic. For the immediate present, most used machinery customers are reported still living comfortably off steel inventories—their own stocks or those in warehouses.

"My customers are getting all the steel they want," claims one rebuilder. And the strike is expected to end sometime between Aug. 1 and 15 by many metalworkers here. They are sure they can keep going until then, have ample orders to fill thereafter and a continuing need for additional tools. Finally, as a long-term consideration, there is general agreement here that the strike settlement will bring improved stability in steel—both in supplies and prices. This is strong encouragement to many metalworkers to go ahead with their own expansion plans.



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## BENDER

2500 Wallace Hydr. Bender; 180", Cap'y 2 1/2"

## BENDING ROLLS

6" x 3/16" Niagara, Initial Type  
6" x 3/8" Webb Ral., Initial Type  
10" x 10 Ga. Borchert, Initial Type  
12" x 3/8" Cleveland Pyramid Type  
18" x 3/8" Niles Pyramid Type  
27" x 1" Southwark Pyramid Type

## BRAKES—LEAF TYPE

10" x 16 Ga. Dreis & Krump Hand Operated  
12" x 3/8" Dreis & Krump  
12" x 3/8" Dreis & Krump, Motor Driven

## BRAKES—PRESS TYPE

10" x 1 1/2" Superior Hydraulic NEW

## CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton P&H 29" Span 230 Volt D.C.  
5 ton Shepard Niles 45" Span 220/440 A.C.  
5 ton Shepard Niles 55" Span 220 Volt D.C.  
5 ton P&H 80" Span 220/360 A.C.  
5 ton Cleveland 94" Span 220 Volt D.C.  
10 ton Cyclops 49" Span 220/440 A.C.  
10 ton P&H 77" Span 220 Volt D.C.  
10 ton P&H 96" Span 220 Volt D.C.  
50 ton Hand Oper. 100" Span 220/360 A.C.  
120 ton Whiting 80" Span 220/360 A.C.

## CUT OFF MACHINES

Yoder AD-2 Cut-off, Max. Capacity 3/4" O.D.  
Yoder Type L Flying Cut-off, Cap'y 3/4" to 3" tubing

## FORGING MACHINES

2" Ajax, Air Clutch  
1" to 5" Acme, Ajax, National

## HAMMERS BOARD DROP—STEAM DROP

STEAM FORGING—200 lb. to 20,000 lb.

2000# Chambersburg Board Drop Model J-2

## LATHE—TURRET

#2A Warner & Swasey Univ. Type M 510 Preselector

Head. LATE.

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60" United 17 Rolls 3 1/2" Dia.  
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72" McKay 17 Rolls 2 1/2" Dia. Hacked-up  
84" McKay 17 Rolls 4 1/2" Dia.  
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600 ton Southwark, 16" Stroke, Bed 60x74"  
750 ton Elmes, 54" Stroke, Platen 30 1/2 x 38"  
800 ton Clearing, 48" Stroke, Bed 48x58"  
1000 ton Lake Erie Dble Acting, 46" Strokes, Bed Area & Platen 72" x 146"

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Clearing Model TF41500-200 Triple Acting Strokes

40, 32, 14", Bed Area 100" x 200"

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Style KF Cleveland 36" Throat, Punch 1 1/2" thru 1"  
Style W Cleveland 60" Throat, 312 Ton  
Pels LUSSEFF, Punch 1 1/2" x 1", Shear Angles 6 x 8 x 3/4", Rd. 2 1/2", Sq. 2 1/2", etc.

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10" x 16" Single Stand, Two High  
12" x 16" Phila. Single Stand, Two High  
12" x 28" Standard Single Stand, Two High  
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15" x 30" G & M Single Stand, Two High

16" x 24" Farrel Two Stand, Two High  
22" x 12" x 40" Lewis 3-High Sheet Mill  
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28" x 54" United Single Stand, Two High  
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14" x 3/4" Dreis & Krump

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Qu.	KW	Make	R.P.M.	D.C. Volts	A.C. Volts
1	2500	Whase	720	600	4160/2300
1	2800	Al. Ch.	720	250	4160/2300
1	1200	Whase	720	600	2300
1	1120	Elliot	720	260/230	2300
1	500	G.E.	1200	250	2300/440
1	500	Ch. Wb.	720	575/600	2300/440
1	300	G.E.	1200	250/275	2300
1	300	Elliot	1200	125	4000/2300
1	150	G.E.	1200	250	2300/440
1	120	Whase	1200	250	2300/440
1	100	Al. Ch.	1200	250	4000/2300

### DIRECT CURRENT MOTORS

Qu.	H.P.	Make	Type	Volts	R.P.M.
2	3000	Whase	Mill	525	600
6	1500	Whase	Mill	525	600
4	700	Whase	Mill	250	300/700
2	600	Al. Ch.	Mill	600	300/600
2	600	Whase	Mill	230	110/230
2	500	Whase	Mill	250	285/710
1	450	Whase	SK	230	450/600
1	350	G.E.	CD-160	230	1150
1	300	Whase	Mill	230	300
4	275	Whase	QM	425/850	
1	200/250	El. Dy.	Fed. Brg.	230	400/1200
1	200	Whase	SK-210	230	400/800
1	180	G.E.	MPC	230	400
1	150	Whase	SK-201	230	300/900
2	125	Whase	SK-184	230	575/850
1	125	G.E.	MPC	230	400/600
1	100	El. Dy.	30-S	230	450/1350
2	100	El. Dy.	30-S	230	475/850
1	80	Reliance	651-T	230	575/1150
1	60/80	El. Dy.	268	230	525/1150
1	40	G.E.	CD-123	230	800/1000
1	40	Whase	SK-140	230	500/1700
1	32 1/2	Whase	SK-150	230	400/1200
2	25	Whase	SK-93	230	1800
3	20	Ch. Wb.	D.P.B.R.	230	1150/2400
1	20	Whase	SK-123	230	400/1200
1	15	G.E.	CD-85	230	575/2300
2	15	Whase	SK-100L	230	500/1500
1	15	Reliance	155-T	230	400/1600
1	10	Whase	SK-103	230	400/1600
1	10	Al. Ch.	E-123	230	300/1200
4	10	Whase	SK-91	230	250/1000
1	7 1/2	G.E.	CD-75	230	680/2070
1	7 1/2	G.E.	CD-85	230	450/1350
4	5 1/2	Reliance	T.E.F.C.	230	337/1850

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Qu.	H.P.	Make	Type	Volts	Speed
1	1500	G.E.	MT	6000	1187
1	1100	G.E.	IM	2300	720
1	1000	A.C.	Mill	2300	216
1	800	G.E.	MT-124Y	2300	293
1	750	G.E.	MT-373	2300	1190
1	700	A.C.	MT	2300	350
1	500	Whase	CW	500	500
1	480	Whase	CW-905A	440	1170
1	400	Whase	CW	440	514
1	400	Whase	CW-1213	2200	425
1	350	G.E.	IM-17A	440/2200	720
1	350	G.E.	MT-124Y	4000	257
1	250	G.E.	MT-559B	2200	1800
1	250	Al. Ch.	20GB	350	600
1	200	Cr. Wb.	IM	440	485
1	200	G.E.	IM	2300	580
1	150 (unused)	Whase	CW	2300	425
2	125	A.C.	ANY	440	720
1	100	Al. Ch.	W-16	440	805
1	100	G.E.	IM-16	2200	425
1	100	G.E.	IM	440	600
4	100	A.C.	ANY	440	605

### SQUIRREL CAGE

Qu.	H.P.	Make	Type	Volts	RPM
1	800	G.E.	KT-573	2200	1180
2	650	G.E.	PT-559BY	440	2570
2	450	Whase	CS-1420	2300/4150	554
1	400	G.E.	TE-15B	2300	1185
1	400	G.E.	TK	2300	500
1	300	G.E.	TK-17	440	580
3	300	G.E.	KT-357	440	1900
1	150/75	G.E.	TK	440/900/450	
1	150	Whase	CS-856B	440	820
1	150	Whase	CS	440	580
2	125	Al. Ch.	AWW	2200	1750

### SYNCHROUS

Qu.	H.P.	Make	Type	Volts	RPM
1	7000	G.E.	ATT	2200/6000	600
1	4350	G.W.	2501RL4000/6000/13800	514	
1	2850	Whase	8 p.f.	2300/4000	514
1	2500	Whase	J.P.L.	2300	720
2	2000	Whase	E-100	2300	120
2	1750	G.E.	ATT	2300	3600
1	1735	G.E.	ATT	2300/12000	600
2	500	G.E.	TS-7567	2200	1200
1	450	Whase	TS-7567	2200	128.5
1	450	Whase	TS-7567	2200	450
1	400	G.E.	TR-7565	2200	1200
1	375	G.E.	ATT	440	1800
1	325	G.E.	ATT	440	1800

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700-ton Ajax High Speed Forging Press

50,000# Standard Double Draw Bench

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10" x 1/2" Plate Shear, Long & Allistatter 10" throat, M.D. Rebuilt

10" x 1" Long & Allistatter Plate Shear

Hilles & Jones and Buffalo Shears 1 1/2", 2", 2 1/2", 3", 3 1/4", 4" and 4 1/4"

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Nazel Air Forging Hammers, #2-B, 4-B, 5-N

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#6, #27 U-type

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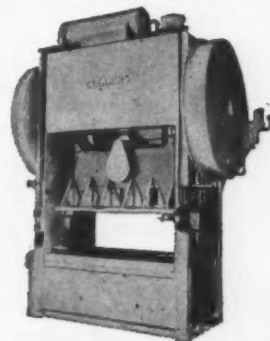
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We need 150 pcs. M-78 Pusher Dogs  
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**HIGH GRADE MEN** — Salaries \$5,000 to  
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calibre have used successfully our confidential  
service in presenting their qualifications to em-  
ployers. We handle all negotiations. Submit record  
with inquiry. The National Business Bourse, 20  
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**MANUFACTURERS' REPRESENTATIVE**  
seeking additional line of fine quality railroad  
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or equipment. Widely known. 25 years' experience  
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**PLATES, BEAMS, ANGLES, BARS, ETC.**  
German broker living West-Germany, well con-  
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responsible for availability at present time. Cap-  
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**AGENTS WANTED** to handle a new type  
chemical fastener superior to all present mechani-  
cal methods of lock-fastening. Contacts in metal  
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for aggressive man who will be satisfied with low  
initial volume for substantial rewards later on.  
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vision of prominent machinery company. To di-  
rect sales and advertising. Top salary with  
unlimited opportunity for advancement. Give com-  
plete resume in first letter. Replies confidential.  
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**WANTED SALES ENGINEER**—Sales exper-  
ience in heat treating furnaces and general burner  
application. San Francisco and surrounding area.  
Well established company handling complete line.  
Supply job and educational history—salary re-  
quirements. Address Box G-372, care The Iron  
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**SUPERVISOR**

To head up modern electric furnace shop.  
Must have experience in production of low car-  
bon steel and be thoroughly experienced in  
production of stainless steel. Please send  
resume of qualifications and personal data to:

ADDRESS BOX G-365

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**PURCHASING AGENT, MINERALS AND  
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spread plant operations. Technical training;  
familiar with specifications for coal, coke, ore, lime-  
stone, dolomite, lime, clay, fluorspar, scrap, re-  
fractories, ganister, charcoal, etc. 24 to 32 yrs.  
old. Be able to initiate and conduct negotiations  
on contracts. Headquarters in East with minor  
travelling to using plants and to sources of sup-  
ply. Address Box 367, care The Iron Age, Chest-  
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**METALLURGIST**—Specialty rolling mill in  
Eastern Pennsylvania requires metallurgist to  
handle development of new products through  
laboratory, production and application phases.  
Mill or laboratory experience preferred. Pay ap-  
proximately \$8,000 depending upon experience.  
Excellent chance for advancement in small grow-  
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**TUBE MILL FOREMAN**—Familiar with all  
phases manufacturing of stainless steel tubing.  
Growing concern, excellent opportunity for future.  
Location New England. Will pay re-location ex-  
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**Try the WANTED SECTION**

for

**"Hard-to-Find" Materials  
or Equipment**

## METALWORKING BRIEFS

Continued from P. 21

of such a thing happening. While Mr. Goldberg is primarily the legal aid in negotiations, he is also credited with being a sharp and wideawake economist.

Behind all the flit in the current steel negotiations is the cold hard fact that the union team has met its match this year for stamina under fire; fire from Washington and from customers. And that's not all.

A wage package of the size Dave McDonald is holding out for—he made a "suggestion" some weeks ago that amounted to about 26¢ an hour the first year—would require a steep price increase. The leading producer is in no mood to be pilloried for starting a new wave of inflation. In the background are many steel users who are counselling steel firms to "hold the fort."

It is clear that the 12 steel companies are standing together and that any chance of a split is a million-to-one shot, although not all of the 12 see eye to eye on how to settle the strike.

At least a few were dead set against a contract any shorter than five years. By coming down to the 3-year time limit, it seems likely that they will be hard to convince on any upping of the money part of the package.

### Steel Answers Price Criticism

Steel producers involved in the deadlocked negotiations with steel labor say the union's charges of price-gouging are untrue. The union's economic report, say the companies, contains many misrepresentations and distortions about wages and profits in the steel industry. The companies point out that a basic statement just compiled from government and other authoritative sources completely refutes the "unfair" allegations in the union's report.

### What Nickel Decision Means

The government's decision to omit new stockpile purchases in fiscal 1957 of nickel, copper and aluminum means that all existing procurement contracts involving these metals are to continue in effect. But no new deals for the national stockpiles will be made. As in past years, the government will continue to take the entire output of the Nicaro nickel refining plant. Some will be stockpiled.

### Sharon Ups Stainless, Alloy Capacity

Sharon Steel Corp. will spend \$6 million on a new electric furnace shop to double present stainless and high alloy steel capacity. A 100-ton furnace has been ordered from American Bridge Div. of U. S. Steel Corp. This is part of a program that includes a \$13.5 million blooming mill and addition of 350,000 tons of openhearth capacity.

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## For High Pressure (to 6000 P.S.I.) MANUAL WATER VALVES

that last

Specify "SHEAR-SEAL" design



4-Way, Manipulator, Dual pressure and Shut-off Valves from 1/4 to 1 1/2" N.P.T.



Note the mirrorlike sealing surfaces on this Dual Pressure Valve rotor after 4 years of service.

On extrusion presses, die casting machines, rubber and plastic molding presses and on blowout preventers, they have performed without maintenance longer than any other type of valve.

### This LONG, MAINTENANCE-FREE

**SERVICE** is possible because the metal-to-metal sealing surfaces are self-aligning and actually improve with use through continued lapping action. Sealing qualities do not diminish because a spring compensates for the wear.

### DIRT CANNOT SCORE SEALS

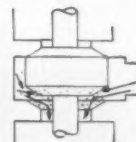
because flow is through "Shear-Seals," sealing surfaces remain in constant intimate contact.

### COMPLETE CONTROL OF

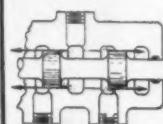
**YOUR CIRCUIT** because "Shear-Seal" design is excellent for throttling. It permits opening to any desired degree of flow with smooth action and without fighting fluid pressure.

The "Shear-Seal" action eliminates line surges and the round tubular flow passages provide more flow and velocity capacity (up to 60 ft. per sec.) because they are unobstructed by spools or poppets.

This is why  
we don't use  
SPOOL OR  
POPPET DESIGN



Poppets score



Spools leak

Write for Bulletin W-5.

## BARKSDALE VALVES

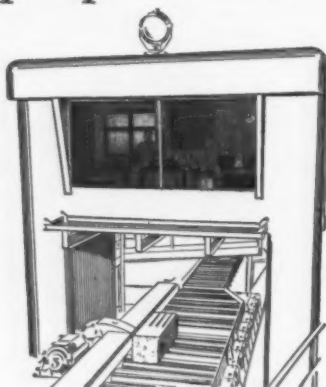


5125 Alcoa Avenue, Los Angeles 58, California

*Now...* **EC&M**

## AUTOMATIC-POSITIONING Control

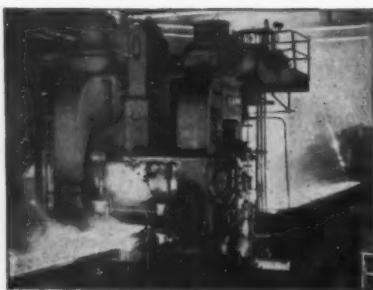
sets blooming mill screwdowns  
to *pin point* accuracy . . .



Reduces roller's tasks 1/3

•—•  
New operators learn  
faster

•—•  
Accurate drafts reduce  
rejections



On plate mills and roughing stands, edger rolls and side guide movements can be automatically coordinated with screwdown movements.

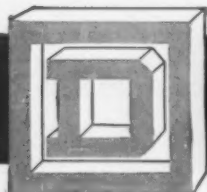


Indexes *automatically* from pass to  
pass to speed rolling and cut costs . . .

To meet the challenge of ever-increasing costs, rolling mill management-teams are turning to automatic operation of screwdowns and associated drives. Precise roll drafts give a higher quality product and new operators become seasoned in a shorter time. Removing the need to coordinate the screwdown with mill reversal enables the roller to concentrate on the manipulation of main motor and work tables for faster and more efficient operation.

The roller pushes a momentary-button only once for each pass, and the rolls are driven to the exact pre-selected settings . . . no overtravel with subsequent inching into position. The operation is entirely automatic for each complete rolling schedule.

This EC&M Automatic-Positioning Screwdown Control system is readily applied to ferrous and non-ferrous mills. New Booklet 9250 fully describes this control and shows many interesting installations. Write for your copy.



**SQUARE D COMPANY**

EC & M DIVISION

CLEVELAND 28, OHIO



THIRD IN THE SERIES

# Customer's Report



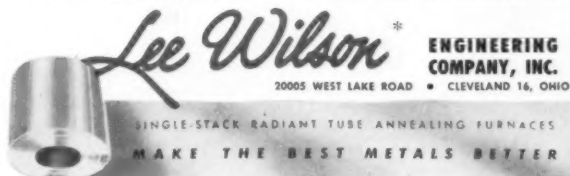
*"Every charge is special—since  
we went Single Stack 100%!"*

In the course of a conversation with a large steelmaker, he wrote this advertisement for us when he said — "I like this single stack annealing system. It enables us to give every charge preferential treatment. When we had the old four stacks, we used a couple of these single stack furnaces for those special orders that required higher quality anneal, or had to be delivered in a rush. Now, with all single stacks, *every order is a special order with us*, and with the return of stronger competition, I think it will pay off big."

It's been proven time and time again. The single stack will do a better job, faster. This means closer annealing control, important in modern metals — and better customer service, fewer dollars tied up in process inventory. The advantage is all with the single stack. And it's important to remember, too, Lee Wilson developed and designed more than 95% of the single stack equipment in operation today.

## Only Lee Wilson Furnaces Give You All These Advantages

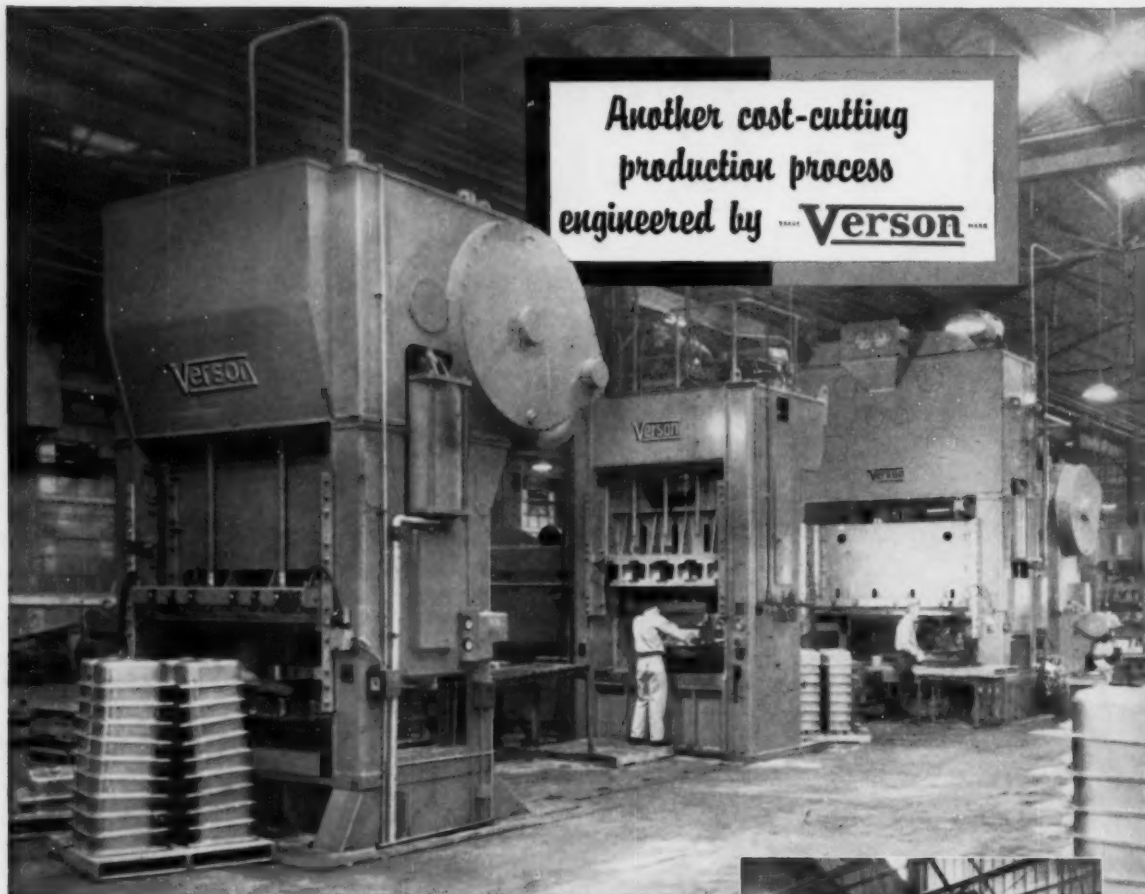
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| 1. GREATER FLEXIBILITY           | 6. MINIMUM PROCESS INVENTORY   |
| 2. MORE UNIFORM HEAT APPLICATION | 7. REDUCED LABOR COST          |
| 3. IMPROVED CUSTOMER SERVICE     | 8. BETTER OPERATING CONDITIONS |
| 4. HIGHER PRODUCTION             | 9. LOWER MAINTENANCE COST      |
| 5. BETTER LOAD FACTOR            | 10. REDUCED INSTALLATION COSTS |



\* ORIGINATORS AND LEADING PRODUCERS OF SINGLE-STACK RADIANT TUBE FURNACES



*The trend is to single stack. One of the nation's largest annealing departments recently put into operation 24 Lee Wilson Single Stack Furnaces and 72 bases.*

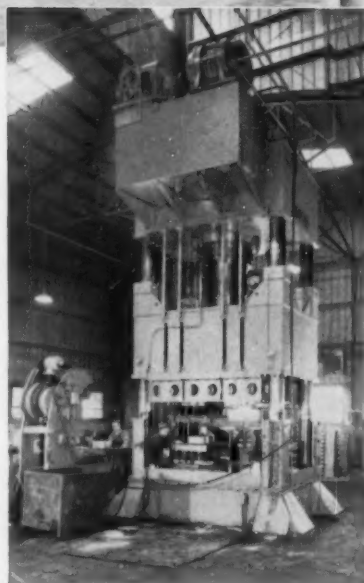


## This **Verson** line-up cuts costs on double sump sinks

♥The press line illustrated above, part of the final operations in forming double sump sink units before porcelain enamelling, includes Verson eccentric, hydraulic and crank presses. Previous operations on the sinks include deep drawing the sumps to a depth of  $7\frac{3}{8}$ " from 14 gauge Armco deep drawing stock on a 1000 ton Verson hydraulic press and piercing and embossing the center drain hole in the sinks on a Verson O.B.I. Both of these presses are shown at the right.

This is more than just a line-up of Verson presses . . . it's a production process engineered by Verson to cut costs as an integrated part of the complete manufacturing program. Verson has the experience and facilities to meet the most exacting press requirements . . . and the "know how" to blend these presses into an efficient and practical production process.

Put Verson facilities to work for you. Send an outline of your production requirements.



A Verson Press for every job from 60 tons up.



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